

UNITED STATES NAVAL OBSERVATORY

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U. S. Naval Observatory, Washington, D. C. 20390

May 29, 1964

TABLES OF POLARIS AND THE EQUATION OF TIME 1965 - 1966

This *Circular* contains the tables of Polaris and the Equation of Time for the years 1965 and 1966 in the same form as published in the *American Ephemeris and Nautical Almanac* prior to 1960. Tables for future years will appear in *Astronomical Phenomena* which is available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., 20402.

EQUATION OF TIME, 1965

APPARENT—MEAN

FOR 0^h UNIVERSAL TIME

DAY	JANUARY			FEBRUARY			MARCH			APRIL			MAY			JUNE		
	E. of T.	Δ(E. of T.)		E. of T.	Δ(E. of T.)		E. of T.	Δ(E. of T.)		E. of T.	Δ(E. of T.)		E. of T.	Δ(E. of T.)		E. of T.	Δ(E. of T.)	
	m	s	s	m	s	s	m	s	s	m	s	s	m	s	s	m	s	s
1	- 3	22.50	-28.51	-13	35.26	- 8.05	-12	31.21	+11.65	- 4	04.28	+17.88	+ 2	53.21	+ 7.25	+ 2	23.25	- 9.18
2	- 3	51.01	-28.07	-13	43.31	- 7.24	-12	19.56	+12.16	- 3	46.40	+17.76	+ 3	00.46	+ 6.72	+ 2	14.07	- 9.56
3	- 4	19.08	-27.69	-13	50.55	- 6.41	-12	07.40	+12.62	- 3	28.64	+17.62	+ 3	07.18	+ 6.18	+ 2	04.51	- 9.92
4	- 4	46.77	-27.29	-13	56.96	- 5.60	-11	54.78	+13.10	- 3	11.02	+17.47	+ 3	13.36	+ 5.64	+ 1	54.59	-10.25
5	- 5	14.06	-26.86	-14	02.56	- 4.76	-11	41.68	+13.54	- 2	53.55	+17.32	+ 3	19.00	+ 5.09	+ 1	44.34	-10.57
6	- 5	40.92	-26.40	-14	07.32	- 3.95	-11	28.14	+13.98	- 2	36.23	+17.14	+ 3	24.09	+ 4.55	+ 1	33.77	-10.87
7	- 6	07.32	-25.89	-14	11.27	- 3.12	-11	14.16	+14.38	- 2	19.09	+16.93	+ 3	28.64	+ 4.00	+ 1	22.90	-11.14
8	- 6	33.21	-25.38	-14	14.39	- 2.31	-10	59.78	+14.79	- 2	02.16	+16.73	+ 3	32.64	+ 3.45	+ 1	11.76	-11.39
9	- 6	58.59	-24.81	-14	16.70	- 1.51	-10	44.99	+15.17	- 1	45.43	+16.50	+ 3	36.09	+ 2.90	+ 1	00.37	-11.64
10	- 7	23.40	-24.24	-14	18.21	- 0.70	-10	29.82	+15.54	- 1	28.93	+16.25	+ 3	38.99	+ 2.35	+ 0	48.73	-11.87
11	- 7	47.64	-23.63	-14	18.91	+ 0.08	-10	14.28	+15.87	- 1	12.68	+15.99	+ 3	41.34	+ 1.79	+ 0	36.86	-12.06
12	- 8	11.27	-23.02	-14	18.83	+ 0.87	- 9	58.41	+16.19	- 0	56.69	+15.71	+ 3	43.13	+ 1.22	+ 0	24.80	-12.25
13	- 8	34.29	-22.36	-14	17.96	+ 1.63	- 9	42.22	+16.50	- 0	40.98	+15.40	+ 3	44.35	+ 0.66	+ 0	12.55	-12.42
14	- 8	56.65	-21.70	-14	16.33	+ 2.38	- 9	25.72	+16.77	- 0	25.58	+15.08	+ 3	45.01	+ 0.11	+ 0	00.13	-12.56
15	- 9	18.35	-21.02	-14	13.95	+ 3.11	- 9	08.95	+17.02	- 0	10.50	+14.73	+ 3	45.12	- 0.48	- 0	12.43	-12.70
16	- 9	39.37	-20.33	-14	10.84	+ 3.84	- 8	51.93	+17.25	+ 0	04.23	+14.38	+ 3	44.64	- 1.04	- 0	25.13	-12.80
17	- 9	59.70	-19.63	-14	07.00	+ 4.53	- 8	34.68	+17.46	+ 0	18.61	+14.00	+ 3	43.60	- 1.60	- 0	37.93	-12.89
18	-10	19.33	-18.92	-14	02.47	+ 5.21	- 8	17.22	+17.63	+ 0	32.61	+13.59	+ 3	42.00	- 2.17	- 0	50.82	-12.96
19	-10	38.25	-18.19	-13	57.26	+ 5.88	- 7	59.59	+17.79	+ 0	46.20	+13.19	+ 3	39.83	- 2.72	- 1	03.78	-13.01
20	-10	56.44	-17.46	-13	51.38	+ 6.52	- 7	41.80	+17.91	+ 0	59.39	+12.75	+ 3	37.11	- 3.29	- 1	16.79	-13.02
21	-11	13.90	-16.72	-13	44.86	+ 7.17	- 7	23.89	+18.04	+ 1	12.14	+12.31	+ 3	33.82	- 3.85	- 1	29.81	-13.04
22	-11	30.62	-15.97	-13	37.69	+ 7.76	- 7	05.85	+18.10	+ 1	24.45	+11.84	+ 3	29.97	- 4.38	- 1	42.85	-13.02
23	-11	46.59	-15.21	-13	29.93	+ 8.38	- 6	47.75	+18.18	+ 1	36.29	+11.38	+ 3	25.59	- 4.94	- 1	55.87	-12.97
24	-12	01.80	-14.45	-13	21.55	+ 8.95	- 6	29.57	+18.21	+ 1	47.67	+10.89	+ 3	20.65	- 5.44	- 2	08.84	-12.90
25	-12	16.25	-13.67	-13	12.60	+ 9.54	- 6	11.36	+18.24	+ 1	58.56	+10.40	+ 3	15.21	- 5.98	- 2	21.74	-12.81
26	-12	29.92	-12.89	-13	03.06	+10.08	- 5	53.12	+18.24	+ 2	08.96	+ 9.89	+ 3	09.23	- 6.48	- 2	34.55	-12.70
27	-12	42.81	-12.09	-12	52.98	+10.63	- 5	34.88	+18.22	+ 2	18.85	+ 9.38	+ 3	02.75	- 6.98	- 2	47.25	-12.56
28	-12	54.90	-11.30	-12	42.35	+11.14	- 5	16.66	+18.20	+ 2	28.23	+ 8.85	+ 2	55.77	- 7.45	- 2	59.81	-12.38
29	-13	06.20	-10.50				- 4	58.46	+18.14	+ 2	37.08	+ 8.33	+ 2	48.32	- 7.93	- 3	12.19	-12.19
30	-13	16.70	- 9.69				- 4	40.32	+18.07	+ 2	45.41	+ 7.80	+ 2	40.39	- 8.35	- 3	24.38	-11.95
31	-13	26.39	- 8.87				- 4	22.25	+17.97				+ 2	32.04	- 8.79			

EQUATION OF TIME, 1965

APPARENT—MEAN

FOR 0^h UNIVERSAL TIME

DAY	JULY			AUGUST			SEPTEMBER			OCTOBER			NOVEMBER			DECEMBER		
	E. of T.		Δ(E. of T.)	E. of T.		Δ(E. of T.)	E. of T.		Δ(E. of T.)	E. of T.		Δ(E. of T.)	E. of T.		Δ(E. of T.)	E. of T.		Δ(E. of T.)
	m	s	"	m	s	"	m	s	"	m	s	"	m	s	"	m	s	"
1	- 3	36.33	-11.70	- 6	16.44	+ 3.55	- 0	09.38	+18.92	+10	08.13	+19.27	+16	21.46	+ 1.55	+11	08.53	-22.45
2	- 3	48.03	-11.41	- 6	12.89	+ 4.18	+ 0	09.54	+19.20	+10	27.40	+19.00	+16	23.01	+ 0.75	+10	46.08	-23.07
3	- 3	59.44	-11.11	- 6	08.71	+ 4.80	+ 0	28.74	+19.51	+10	46.40	+18.69	+16	23.76	- 0.04	+10	23.01	-23.64
4	- 4	10.55	-10.78	- 6	03.91	+ 5.42	+ 0	48.25	+19.77	+11	05.09	+18.36	+16	23.72	- 0.85	+ 9	59.37	-24.23
5	- 4	21.33	-10.42	- 5	58.49	+ 6.05	+ 1	08.02	+20.03	+11	23.45	+18.02	+16	22.87	- 1.66	+ 9	35.14	-24.78
6	- 4	31.75	-10.05	- 5	52.44	+ 6.66	+ 1	28.05	+20.24	+11	41.47	+17.64	+16	21.21	- 2.47	+ 9	10.36	-25.30
7	- 4	41.80	- 9.67	- 5	45.78	+ 7.27	+ 1	48.29	+20.47	+11	59.11	+17.26	+16	18.74	- 3.31	+ 8	45.06	-25.80
8	- 4	51.47	- 9.26	- 5	38.51	+ 7.86	+ 2	08.76	+20.64	+12	16.37	+16.84	+16	15.43	- 4.14	+ 8	19.26	-26.27
9	- 5	00.73	- 8.84	- 5	30.65	+ 8.46	+ 2	29.40	+20.82	+12	33.21	+16.41	+16	11.29	- 4.98	+ 7	52.99	-26.75
10	- 5	09.57	- 8.41	- 5	22.19	+ 9.04	+ 2	50.22	+20.96	+12	49.62	+15.96	+16	06.31	- 5.84	+ 7	26.24	-27.16
11	- 5	17.98	- 7.97	- 5	13.15	+ 9.60	+ 3	11.18	+21.09	+13	05.58	+15.48	+16	00.47	- 6.70	+ 6	59.08	-27.58
12	- 5	25.95	- 7.50	- 5	03.55	+10.18	+ 3	32.27	+21.18	+13	21.06	+14.97	+15	53.77	- 7.57	+ 6	31.50	-27.95
13	- 5	33.45	- 7.04	- 4	53.37	+10.72	+ 3	53.45	+21.27	+13	36.03	+14.46	+15	46.20	- 8.41	+ 6	03.55	-28.33
14	- 5	40.49	- 6.56	- 4	42.65	+11.27	+ 4	14.72	+21.32	+13	50.49	+13.90	+15	37.79	- 9.29	+ 5	35.22	-28.63
15	- 5	47.05	- 6.06	- 4	31.38	+11.79	+ 4	36.04	+21.35	+14	04.39	+13.34	+15	28.50	-10.15	+ 5	06.59	-28.93
16	- 5	53.11	- 5.55	- 4	19.59	+12.29	+ 4	57.39	+21.37	+14	17.73	+12.76	+15	18.35	-11.02	+ 4	37.66	-29.20
17	- 5	58.66	- 5.06	- 4	07.30	+12.81	+ 5	18.76	+21.36	+14	30.49	+12.15	+15	07.33	-11.88	+ 4	08.46	-29.41
18	- 6	03.72	- 4.54	- 3	54.49	+13.30	+ 5	40.12	+21.32	+14	42.64	+11.52	+14	55.45	-12.72	+ 3	39.05	-29.61
19	- 6	08.26	- 4.00	- 3	41.19	+13.76	+ 6	01.44	+21.27	+14	54.16	+10.89	+14	42.73	-13.57	+ 3	09.44	-29.76
20	- 6	12.26	- 3.48	- 3	27.43	+14.23	+ 6	22.71	+21.19	+15	05.05	+10.23	+14	29.16	-14.39	+ 2	39.68	-29.89
21	- 6	15.74	- 2.92	- 3	13.20	+14.68	+ 6	43.90	+21.10	+15	15.28	+ 9.57	+14	14.77	-15.22	+ 2	09.79	-29.95
22	- 6	18.66	- 2.39	- 2	58.52	+15.11	+ 7	05.00	+21.01	+15	24.85	+ 8.89	+13	59.55	-16.01	+ 1	39.84	-30.00
23	- 6	21.05	- 1.82	- 2	43.41	+15.54	+ 7	26.01	+20.87	+15	33.74	+ 8.20	+13	43.54	-16.81	+ 1	09.84	-30.00
24	- 6	22.87	- 1.26	- 2	27.87	+15.96	+ 7	46.88	+20.73	+15	41.94	+ 7.49	+13	26.73	-17.58	+ 0	39.84	-29.96
25	- 6	24.13	- 0.70	- 2	11.91	+16.37	+ 8	07.61	+20.58	+15	49.43	+ 6.78	+13	09.15	-18.33	+ 0	09.88	-29.88
26	- 6	24.83	- 0.10	- 1	55.54	+16.76	+ 8	28.19	+20.40	+15	56.21	+ 6.07	+12	50.82	-19.06	- 0	20.00	-29.78
27	- 6	24.93	+ 0.48	- 1	38.78	+17.15	+ 8	48.59	+20.22	+16	02.28	+ 5.33	+12	31.76	-19.78	- 0	49.78	-29.61
28	- 6	24.45	+ 1.08	- 1	21.63	+17.53	+ 9	08.81	+20.00	+16	07.61	+ 4.60	+12	11.98	-20.48	- 1	19.39	-29.45
29	- 6	23.37	+ 1.69	- 1	04.10	+17.89	+ 9	28.81	+19.79	+16	12.21	+ 3.85	+11	51.50	-21.16	- 1	48.84	-29.20
30	- 6	21.68	+ 2.30	- 0	46.21	+18.25	+ 9	48.60	+19.53	+16	16.06	+ 3.08	+11	30.34	-21.81	- 2	18.04	-28.97
31	- 6	19.38	+ 2.94	- 0	27.96	+18.58				+16	19.14	+ 2.32				- 2	47.01	-28.67

POLARIS, 1965

JANUARY

FEBRUARY

MARCH

DAY OF MONTH	GREENWICH HOUR ANGLE FOR 0 ^h UNIVERSAL TIME			APPARENT DECLINATION FOR 0 ^h UNIVERSAL TIME			MEAN TIME GREENWICH TRANSIT			GREENWICH HOUR ANGLE FOR 0 ^h UNIVERSAL TIME			APPARENT DECLINATION FOR 0 ^h UNIVERSAL TIME			MEAN TIME GREENWICH TRANSIT			GREENWICH HOUR ANGLE FOR 0 ^h UNIVERSAL TIME			APPARENT DECLINATION FOR 0 ^h UNIVERSAL TIME			MEAN TIME GREENWICH TRANSIT		
	°	'	"	°	'	"	h	m	s	°	'	"	°	'	"	h	m	s	°	'	"	°	'	"	h	m	s
1	70	31	49.2	+89	06	21.62	19	14	42	101	15	42.3	+89	06	24.12	17	12	07	129	00	37.1	+89	06	21.00	15	21	25
2	71	31	14.9	89	06	21.80	19	10	45	102	15	13.4	89	06	24.11	17	08	09	130	00	04.1	89	06	20.82	15	17	28
3	72	30	41.5	89	06	22.00	19	06	48	103	14	45.1	89	06	24.08	17	04	12	130	59	31.2	89	06	20.63	15	13	31
4	73	30	09.3	89	06	22.18	19	02	51	104	14	17.1	89	06	24.04	17	00	14	131	58	57.9	89	06	20.41	15	09	34
5	74	29	38.2	89	06	22.37	18	58	53	105	13	48.6	89	06	23.97	16	56	17	132	58	23.8	89	06	20.17	15	05	37
6	75	29	08.0	+89	06	22.53	18	54	56	106	13	19.3	+89	06	23.89	16	52	19	133	57	48.3	+89	06	19.91	15	01	40
7	76	28	38.5	89	06	22.68	18	50	58	107	12	48.9	89	06	23.79	16	48	22	134	57	11.3	89	06	19.65	14	57	43
8	77	28	09.2	89	06	22.81	18	47	01	108	12	17.4	89	06	23.68	16	44	25	135	56	32.8	89	06	19.39	14	53	47
9	78	27	39.8	89	06	22.92	18	43	04	109	11	44.3	89	06	23.58	16	40	28	136	55	52.8	89	06	19.15	14	49	50
10	79	27	09.8	89	06	23.01	18	39	06	110	11	10.2	89	06	23.47	16	36	31	137	55	12.2	89	06	18.91	14	45	53
11	80	26	38.8	+89	06	23.09	18	35	09	111	10	35.6	+89	06	23.39	16	32	34	138	54	31.5	+89	06	18.70	14	41	57
12	81	26	06.5	89	06	23.16	18	31	12	112	10	01.1	89	06	23.32	16	28	37	139	53	51.2	89	06	18.50	14	38	00
13	82	25	32.9	89	06	23.24	18	27	15	113	09	27.6	89	06	23.28	16	24	40	140	53	12.0	89	06	18.30	14	34	03
14	83	24	58.6	89	06	23.32	18	23	18	114	08	55.5	89	06	23.22	16	20	42	141	52	34.1	89	06	18.10	14	30	06
15	84	24	24.3	89	06	23.43	18	19	21	115	08	24.9	89	06	23.16	16	16	45	142	51	57.1	89	06	17.89	14	26	09
16	85	23	50.8	+89	06	23.55	18	15	24	116	07	55.4	+89	06	23.08	16	12	48	143	51	20.4	+89	06	17.65	14	22	12
17	86	23	18.8	89	06	23.68	18	11	26	117	07	25.9	89	06	22.97	16	08	50	144	50	43.3	89	06	17.39	14	18	16
18	87	22	48.4	89	06	23.81	18	07	29	118	06	55.7	89	06	22.82	16	04	53	145	50	05.0	89	06	17.11	14	14	19
19	88	22	19.8	89	06	23.93	18	03	31	119	06	24.5	89	06	22.65	16	00	56	146	49	25.1	89	06	16.81	14	10	22
20	89	21	52.0	89	06	24.01	17	59	34	120	05	51.7	89	06	22.48	15	56	59	147	48	43.6	89	06	16.51	14	06	26
21	90	21	24.1	+89	06	24.05	17	55	37	121	05	17.5	+89	06	22.30	15	53	02	148	48	00.6	+89	06	16.20	14	02	29
22	91	20	55.7	89	06	24.07	17	51	39	122	04	42.4	89	06	22.12	15	49	05	149	47	16.7	89	06	15.91	13	58	33
23	92	20	26.2	89	06	24.08	17	47	42	123	04	06.6	89	06	21.95	15	45	08	150	46	32.3	89	06	15.64	13	54	36
24	93	19	55.5	89	06	24.08	17	43	45	124	03	30.5	89	06	21.78	15	41	11	151	45	47.8	89	06	15.36	13	50	40
25	94	19	23.8	89	06	24.07	17	39	47	125	02	54.5	89	06	21.63	15	37	14	152	45	03.6	89	06	15.10	13	46	44
26	95	18	51.3	+89	06	24.06	17	35	50	126	02	19.2	+89	06	21.48	15	33	17	153	44	20.0	+89	06	14.85	13	42	47
27	96	18	18.6	89	06	24.06	17	31	53	127	01	44.4	89	06	21.32	15	29	20	154	43	36.9	89	06	14.59	13	38	51
28	97	17	46.0	89	06	24.07	17	27	56	128	01	10.4	89	06	21.16	15	25	23	155	42	54.4	89	06	14.32	13	34	54
29	98	17	13.9	89	06	24.08	17	23	59				89	06					156	42	12.2	89	06	14.05	13	30	58
30	99	16	42.5	89	06	24.10	17	20	01				89	06					157	41	30.2	89	06	13.77	13	27	01
31	100	16	12.0	+89	06	24.11	17	16	04										158	40	47.8	+89	06	13.46	13	23	05

POLARIS, 1965

DAY OF MONTH	APRIL			MAY			JUNE		
	GREENWICH HOUR ANGLE FOR 0 ^h UNIVERSAL TIME	APPARENT DECLINATION	MEAN TIME GREENWICH TRANSIT	GREENWICH HOUR ANGLE FOR 0 ^h UNIVERSAL TIME	APPARENT DECLINATION	MEAN TIME GREENWICH TRANSIT	GREENWICH HOUR ANGLE FOR 0 ^h UNIVERSAL TIME	APPARENT DECLINATION	MEAN TIME GREENWICH TRANSIT
	° / ' "	° / ' "	h m s	° / ' "	° / ' "	h m s	° / ' "	° / ' "	h m s
1	159 40 04.7	+89 06 13.14	13 19 08	189 14 21.6	+89 06 04.02	11 21 11	219 41 57.9	+89 05 56.45	9 19 41
2	160 39 20.1	89 06 12.81	13 15 12	190 13 22.0	89 06 03.70	11 17 16	220 40 48.9	89 05 56.31	9 15 46
3	161 38 34.0	89 06 12.48	13 11 16	191 12 21.1	89 06 03.40	11 13 20	221 39 41.3	89 05 56.19	9 11 51
4	162 37 46.2	89 06 12.14	13 07 19	192 11 19.8	89 06 03.13	11 09 25	222 38 35.2	89 05 56.06	9 07 56
5	163 36 56.7	89 06 11.81	13 03 23	193 10 18.7	89 06 02.88	11 05 30	223 37 29.8	89 05 55.92	9 04 01
6	164 36 06.2	+89 06 11.50	12 59 28	194 09 18.5	+89 06 02.64	11 01 34	224 36 24.8	+89 05 55.77	9 00 06
7	165 35 15.4	89 06 11.21	12 55 32	195 08 19.6	89 06 02.42	10 57 39	225 35 19.2	89 05 55.60	8 56 11
8	166 34 25.1	89 06 10.95	12 51 36	196 07 21.7	89 06 02.19	10 53 43	226 34 12.6	89 05 55.42	8 52 16
9	167 33 35.6	89 06 10.69	12 47 39	197 06 24.3	89 06 01.94	10 49 48	227 33 04.7	89 05 55.23	8 48 21
10	168 32 47.3	89 06 10.43	12 43 43	198 05 26.9	89 06 01.68	10 45 52	228 31 55.2	89 05 55.04	8 44 27
11	169 31 59.9	+89 06 10.16	12 39 47	199 04 28.8	+89 06 01.40	10 41 57	229 30 44.6	+89 05 54.87	8 40 32
12	170 31 12.9	89 06 09.89	12 35 51	200 03 29.4	89 06 01.11	10 38 01	230 29 33.2	89 05 54.71	8 36 37
13	171 30 25.5	89 06 09.58	12 31 55	201 02 28.4	89 06 00.81	10 34 06	231 28 21.4	89 05 54.57	8 32 43
14	172 29 37.2	89 06 09.25	12 27 59	202 01 25.9	89 06 00.52	10 30 11	232 27 09.7	89 05 54.46	8 28 48
15	173 28 47.5	89 06 08.92	12 24 03	203 00 22.2	89 06 00.24	10 26 16	233 25 58.5	89 05 54.35	8 24 54
16	174 27 56.1	+89 06 08.58	12 20 07	203 59 17.7	+89 05 59.97	10 22 21	234 24 48.0	+89 05 54.27	8 20 59
17	175 27 03.2	89 06 08.23	12 16 11	204 58 12.7	89 05 59.72	10 18 26	235 23 38.4	89 05 54.19	8 17 04
18	176 26 09.1	89 06 07.90	12 12 15	205 57 07.9	89 05 59.49	10 14 31	236 22 29.6	89 05 54.10	8 13 09
19	177 25 14.1	89 06 07.59	12 08 20	206 56 03.6	89 05 59.28	10 10 36	237 21 21.2	89 05 54.02	8 09 15
20	178 24 18.9	89 06 07.29	12 04 24	207 54 59.9	89 05 59.07	10 06 41	238 20 13.2	89 05 53.93	8 05 20
21	179 23 24.0	+89 06 07.01	12 00 28	208 53 56.8	+89 05 58.86	10 02 45	239 19 05.0	+89 05 53.82	8 01 25
22	180 22 29.4	89 06 06.73	11 56 32	209 52 54.5	89 05 58.66	9 58 50	240 17 56.3	89 05 53.71	7 57 30
23	181 21 35.5	89 06 06.45	11 52 37	210 51 52.4	89 05 58.45	9 54 55	241 16 46.8	89 05 53.60	7 53 35
24	182 20 42.2	89 06 06.18	11 48 41	211 50 50.4	89 05 58.23	9 51 00	242 15 36.0	89 05 53.48	7 49 41
25	183 19 49.3	89 06 05.91	11 44 45	212 49 48.0	89 05 58.00	9 47 05	243 14 23.6	89 05 53.37	7 45 46
26	184 18 56.6	+89 06 05.62	11 40 49	213 48 44.8	+89 05 57.75	9 43 10	244 13 09.8	+89 05 53.28	7 41 52
27	185 18 03.7	89 06 05.32	11 36 53	214 47 40.4	89 05 57.51	9 39 15	245 11 55.0	89 05 53.21	7 37 58
28	186 17 10.3	89 06 05.01	11 32 58	215 46 34.4	89 05 57.26	9 35 20	246 10 40.1	89 05 53.17	7 34 03
29	187 16 15.7	89 06 04.68	11 29 02	216 45 26.7	89 05 57.02	9 31 25	247 09 25.8	89 05 53.16	7 30 09
30	188 15 19.5	89 06 04.35	11 25 06	217 44 17.7	89 05 56.80	9 27 30	248 08 12.8	89 05 53.17	7 26 14
31				218 43 07.8	+89 05 56.61	9 23 35			

POLARIS, 1965

DAY OF MONTH	JULY			AUGUST			SEPTEMBER		
	GREENWICH HOUR ANGLE FOR 0 ^h UNIVERSAL TIME	APPARENT DECLINATION FOR 0 ^h UNIVERSAL TIME	MEAN TIME GREENWICH TRANSIT	GREENWICH HOUR ANGLE FOR 0 ^h UNIVERSAL TIME	APPARENT DECLINATION FOR 0 ^h UNIVERSAL TIME	MEAN TIME GREENWICH TRANSIT	GREENWICH HOUR ANGLE FOR 0 ^h UNIVERSAL TIME	APPARENT DECLINATION FOR 0 ^h UNIVERSAL TIME	MEAN TIME GREENWICH TRANSIT
	° / ' / "	° / ' / "	h m s	° / ' / "	° / ' / "	h m s	° / ' / "	° / ' / "	h m s
1	249 07 01.4	+89 05 53.18	7 22 20	279 29 38.3	+89 05 54.71	5 21 09	309 52 56.1	+89 06 00.84	3 19 56
2	250 05 51.4	89 05 53.20	7 18 25	280 28 27.2	89 05 54.80	5 17 14	310 51 44.9	89 06 01.09	3 16 01
3	251 04 42.2	89 05 53.20	7 14 30	281 27 14.5	89 05 54.90	5 13 20	311 50 33.9	89 06 01.36	3 12 06
4	252 03 32.9	89 05 53.17	7 10 35	282 26 01.0	89 05 55.01	5 09 25	312 49 23.5	89 06 01.65	3 08 12
5	253 02 22.7	89 05 53.13	7 06 41	283 24 46.6	89 05 55.12	5 05 31	313 48 14.1	89 06 01.96	3 04 17
6	254 01 11.2	+89 05 53.08	7 02 46	284 23 32.0	+89 05 55.27	5 01 37	314 47 06.0	+89 06 02.27	3 00 22
7	254 59 58.4	89 05 53.03	6 58 52	285 22 17.5	89 05 55.43	4 57 42	315 45 58.8	89 06 02.59	2 56 27
8	255 58 44.4	89 05 53.00	6 54 57	286 21 03.7	89 05 55.60	4 53 48	316 44 52.9	89 06 02.91	2 52 32
9	256 57 29.7	89 05 52.98	6 51 03	287 19 50.5	89 05 55.79	4 49 53	317 43 47.8	89 06 03.22	2 48 37
10	257 56 14.8	89 05 52.99	6 47 09	288 18 38.6	89 05 55.99	4 45 59	318 42 43.4	89 06 03.52	2 44 42
11	258 55 00.0	+89 05 53.00	6 43 14	289 17 27.9	+89 05 56.19	4 42 04	319 41 39.0	+89 06 03.81	2 40 47
12	259 53 45.6	89 05 53.04	6 39 20	290 16 17.9	89 05 56.39	4 38 09	320 40 34.4	89 06 04.08	2 36 52
13	260 52 32.1	89 05 53.10	6 35 25	291 15 08.6	89 05 56.58	4 34 15	321 39 29.0	89 06 04.35	2 32 57
14	261 51 19.5	89 05 53.15	6 31 31	292 13 59.7	89 05 56.78	4 30 20	322 38 22.8	89 06 04.63	2 29 02
15	262 50 07.9	89 05 53.21	6 27 36	293 12 50.7	89 05 56.95	4 26 25	323 37 15.5	89 06 04.90	2 25 07
16	263 48 57.0	+89 05 53.27	6 23 42	294 11 41.3	+89 05 57.12	4 22 30	324 36 07.5	+89 06 05.19	2 21 12
17	264 47 46.6	89 05 53.34	6 19 47	295 10 31.0	89 05 57.28	4 18 36	325 34 59.1	89 06 05.50	2 17 18
18	265 46 36.4	89 05 53.38	6 15 52	296 09 19.7	89 05 57.45	4 14 41	326 33 50.8	89 06 05.84	2 13 23
19	266 45 25.7	89 05 53.41	6 11 58	297 08 07.2	89 05 57.62	4 10 47	327 32 43.4	89 06 06.20	2 09 28
20	267 44 14.4	89 05 53.44	6 08 03	298 06 54.1	89 05 57.81	4 06 52	328 31 37.4	89 06 06.58	2 05 33
21	268 43 02.1	+89 05 53.47	6 04 08	299 05 40.5	+89 05 58.03	4 02 58	329 30 33.0	+89 06 06.96	2 01 38
22	269 41 48.7	89 05 53.51	6 00 14	300 04 26.8	89 05 58.28	3 59 03	330 29 30.5	89 06 07.34	1 57 43
23	270 40 33.9	89 05 53.56	5 56 20	301 03 14.4	89 05 58.54	3 55 09	331 28 29.3	89 06 07.71	1 53 47
24	271 39 18.3	89 05 53.62	5 52 25	302 02 03.3	89 05 58.83	3 51 14	332 27 28.5	89 06 08.06	1 49 52
25	272 38 02.3	89 05 53.71	5 48 31	303 00 54.1	89 05 59.13	3 47 19	333 26 27.4	89 06 08.38	1 45 57
26	273 36 46.5	+89 05 53.84	5 44 37	303 59 46.6	+89 05 59.41	3 43 24	334 25 25.2	+89 06 08.69	1 42 02
27	274 35 31.9	89 05 53.98	5 40 42	304 58 39.8	89 05 59.67	3 39 29	335 24 21.8	89 06 09.00	1 38 06
28	275 34 19.0	89 05 54.15	5 36 48	305 57 33.2	89 05 59.92	3 35 35	336 23 17.3	89 06 09.32	1 34 11
29	276 33 07.9	89 05 54.31	5 32 53	306 56 25.7	89 06 00.15	3 31 40	337 22 12.4	89 06 09.65	1 30 16
30	277 31 58.0	89 05 54.46	5 28 58	307 55 16.9	89 06 00.37	3 27 45	338 21 07.6	89 06 10.00	1 26 21
31	278 30 48.4	+89 05 54.59	5 25 04	308 54 06.8	+89 06 00.60	3 23 50			

POLARIS, 1965

OCTOBER

NOVEMBER

DECEMBER

DAY OF MONTH	GREENWICH HOUR ANGLE	APPARENT DECLINATION	MEAN TIME GREENWICH TRANSIT	GREENWICH HOUR ANGLE	APPARENT DECLINATION	MEAN TIME GREENWICH TRANSIT	GREENWICH HOUR ANGLE	APPARENT DECLINATION	MEAN TIME GREENWICH TRANSIT
	FOR 0 ^h UNIVERSAL TIME	FOR 0 ^h UNIVERSAL TIME	h m s	FOR 0 ^h UNIVERSAL TIME	FOR 0 ^h UNIVERSAL TIME	h m s	FOR 0 ^h UNIVERSAL TIME	FOR 0 ^h UNIVERSAL TIME	h m s
1	339 20 03.3	+89 06 10.37	1 22 26	9 50 34.3	+89 06 22.18	23 16 48	39 27 19.5	+89 06 33.09	21 18 40
2	340 19 00.0	89 06 10.75	1 18 31	10 49 44.3	89 06 22.58	23 12 52	40 26 40.6	89 06 33.40	21 14 43
3	341 17 58.1	89 06 11.14	1 14 36	11 48 55.5	89 06 22.97	23 08 56	41 26 01.7	89 06 33.69	21 10 46
4	342 16 57.5	89 06 11.53	1 10 41	12 48 07.1	89 06 23.35	23 05 00	42 25 22.4	89 06 33.97	21 06 50
5	343 15 58.1	89 06 11.92	1 06 45	13 47 18.8	89 06 23.71	23 01 04	43 24 41.9	89 06 34.24	21 02 53
6	344 14 59.7	+89 06 12.31	1 02 50	14 46 30.3	+89 06 24.07	22 57 08	44 24 00.5	+89 06 34.51	20 58 57
7	345 14 02.1	89 06 12.69	0 58 54	15 45 40.9	89 06 24.41	22 53 12	45 23 18.4	89 06 34.79	20 55 00
8	346 13 04.8	89 06 13.05	0 54 59	16 44 50.8	89 06 24.75	22 49 16	46 22 35.7	89 06 35.09	20 51 04
9	347 12 07.4	89 06 13.39	0 51 03	17 43 59.7	89 06 25.09	22 45 20	47 21 53.4	89 06 35.40	20 47 07
10	348 11 09.7	89 06 13.73	0 47 08	18 43 08.0	89 06 25.44	22 41 24	48 21 12.2	89 06 35.74	20 43 10
11	349 10 11.0	+89 06 14.06	0 43 12	19 42 16.1	+89 06 25.81	22 37 28	49 20 32.7	+89 06 36.08	20 39 13
12	350 09 11.3	89 06 14.40	0 39 17	20 41 24.9	89 06 26.21	22 33 32	50 19 55.3	89 06 36.42	20 35 16
13	351 08 10.9	89 06 14.74	0 35 21	21 40 35.3	89 06 26.63	22 29 36	51 19 19.6	89 06 36.74	20 31 19
14	352 07 09.9	89 06 15.10	0 31 26	22 39 47.2	89 06 27.05	22 25 39	52 18 44.9	89 06 37.04	20 27 22
15	353 06 09.2	89 06 15.49	0 27 31	23 39 01.3	89 06 27.46	22 21 43	53 18 10.4	89 06 37.31	20 23 25
16	354 05 09.2	+89 06 15.89	0 23 36	24 38 16.7	+89 06 27.87	22 17 47	54 17 35.7	+89 06 37.56	20 19 28
17	355 04 10.7	89 06 16.31	0 19 40	25 37 33.2	89 06 28.25	22 13 50	55 16 59.9	89 06 37.78	20 15 31
18	356 03 13.6	89 06 16.75	0 15 45	26 36 49.7	89 06 28.60	22 09 54	56 16 23.1	89 06 38.01	20 11 35
19	357 02 18.7	89 06 17.18	0 11 49	27 36 05.9	89 06 28.94	22 05 57	57 15 45.4	89 06 38.22	20 07 38
20	358 01 25.2	89 06 17.59	0 07 53	28 35 21.1	89 06 29.26	22 02 01	58 15 07.1	89 06 38.45	20 03 41
21	359 00 32.3	+89 06 17.99	0 03 57	29 34 35.3	+89 06 29.58	21 58 05	59 14 28.8	+89 06 38.69	19 59 44
22	359 59 39.3	89 06 18.36	0 00 01	30 33 48.7	89 06 29.90	21 54 09	60 13 51.1	89 06 38.93	19 55 47
23	0 58 45.8	89 06 18.71	23 56 06	31 33 01.8	89 06 30.23	21 50 12	61 13 14.3	89 06 39.18	19 51 50
24	1 57 51.2	89 06 19.06	23 52 10	32 32 15.0	89 06 30.58	21 46 16	62 12 38.8	89 06 39.45	19 47 53
25	2 56 55.6	89 06 19.41	23 48 14	33 31 29.1	89 06 30.95	21 42 20	63 12 04.4	89 06 39.70	19 43 56
26	3 55 59.0	+89 06 19.77	23 44 19	34 30 44.3	+89 06 31.32	21 38 23	64 11 31.4	+89 06 39.94	19 39 59
27	4 55 02.6	89 06 20.15	23 40 23	35 30 00.8	89 06 31.69	21 34 27	65 10 59.3	89 06 40.17	19 36 02
28	5 54 06.6	89 06 20.53	23 36 27	36 29 18.9	89 06 32.05	21 30 30	66 10 28.0	89 06 40.38	19 32 04
29	6 53 11.4	89 06 20.94	23 32 32	37 28 38.1	89 06 32.42	21 26 33	67 09 56.9	89 06 40.57	19 28 07
30	7 52 17.6	89 06 21.35	23 28 36	38 27 58.6	89 06 32.76	21 22 37	68 09 25.6	89 06 40.74	19 24 10
31	8 51 25.3	+89 06 21.76	23 24 40				69 08 53.9	+89 06 40.90	19 20 13

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE

Reduce the observed altitude of Polaris to the true altitude.

Take out the Greenwich Hour Angle and apparent declination of Polaris for the time of observation. Convert the GHA to time by the table on page 25.

Subtract west longitude, add east longitude; the result is the hour angle of Polaris.

With this hour angle as the vertical argument, and the apparent declination of Polaris as the horizontal argument, take out the correction from the main table and add it to or subtract it from the true altitude, according to its sign.

For altitudes other than 45° , corrections taken from the auxiliary table (page 12) may be applied when necessary for the degree of accuracy required.

Example.—August 5, 1965, at $11^h 40^m 30^s$ P.M. Eastern Standard Time (August 6, $4^h 40^m 30^s$ U.T.), in longitude $82^\circ (5^h 28^m)$ west of Greenwich, suppose the true altitude of Polaris to be $33^\circ 20' 00''$, required the latitude of the place.

G.H.A. of Polaris, page 6, Aug. 6 0^h U.T.

Aug. 7 0^h U.T.

°	'	''
284	23	32.0
285	22	17.5
360	58	45.5

Daily increase (360° plus tabular daily difference)

Conversion to decimals of a degree

[.0167(45'.5) = 0.760; .016667(58'.760) = 0.97935]

By table on page 26, $\frac{4^h 40^m 30^s}{24^h} = 0.194791$; $0.194791 (360^\circ 58' 45.5'') = 70^\circ 31' 55.3''$

Conversion to degrees, minutes and seconds

[60(0.31553) = 18.932; 60(0.932) = 55.9]

G.H.A. of Polaris Aug. 6 0^h U.T.

Increase to $4^h 40^m 30^s$ U.T.

G.H.A. of Polaris at time of observation

°	'	''
284	23	32.0
70	18	55.9
354	42	27.9

Conversion to time, page 25

Longitude of observer

Hour angle of Polaris

Decl. of Polaris, page 6, for time of observation

^h	^m	^s
23	38	50
5	28	
18	10	50

True altitude

Correction from main table, page 10

Correction from Auxiliary table, page 12

Latitude of the place

°	'	''
+89°	05'	55''
+33	20	00
—	2	08
—		9
+33	17	43

Observations of Polaris for latitude should be made when practicable near times of upper or of lower culminations (hour angles 0^h or 12^h). However, at sea, if made near elongation (hour angle 6^h or 18^h), the hour angle, and hence the local time, should be known within one minute.

Decl.		89°05'50"	89°06'00"	89°06'10"	89°06'20"	89°06'30"	89°06'40"	Decl.	
H.A.								H.A.	
^h	^m							^h	^m
0	00	-54 10	-54 00	-53 50	-53 40	-53 30	-53 20	24	00
	03	54 10	54 00	53 50	53 40	53 30	53 20	23	57
	06	54 09	53 59	53 49	53 39	53 29	53 19		54
	09	54 07	53 57	53 47	53 37	53 27	53 17		51
	12	54 05	53 55	53 46	53 36	53 26	53 16		48
0	15	-54 03	-53 53	-53 43	-53 33	-53 23	-53 13	23	45
	18	54 00	53 50	53 40	53 30	53 20	53 10		42
	21	53 56	53 46	53 36	53 26	53 16	53 06		39
	24	53 52	53 42	53 32	53 22	53 12	53 02		36
	27	53 47	53 37	53 27	53 17	53 07	52 57		33
0	30	-53 42	-53 32	-53 22	-53 12	-53 02	-52 52	23	30
	33	53 36	53 26	53 16	53 06	52 56	52 46		27
	36	53 29	53 19	53 10	53 00	52 50	52 40		24
	39	53 22	53 12	53 03	52 53	52 43	52 33		21
	42	53 15	53 05	52 55	52 45	52 35	52 26		18
0	45	-53 07	-52 57	-52 47	-52 37	-52 27	-52 18	23	15
	48	52 58	52 48	52 38	52 29	52 19	52 09		12
	51	52 49	52 39	52 29	52 19	52 10	52 00		09
	54	52 39	52 29	52 19	52 10	52 00	51 50		06
0	57	52 28	52 19	52 09	51 59	51 50	51 40		03
1	00	-52 18	-52 08	-51 58	-51 49	-51 39	-51 29	23	00
	03	52 06	51 56	51 47	51 37	51 28	51 18	22	57
	06	51 54	51 45	51 35	51 25	51 16	51 06		54
	09	51 42	51 32	51 23	51 13	51 03	50 54		51
1	12	-51 29	-51 19	-51 10	-51 00	-50 51	-50 41	22	48

POLARIS, 1965

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FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE

Decl.		89°05'50"	89°06'00"	89°06'10"	89°06'20"	89°06'30"	89°06'40"	Decl.	
H.A.								H.A.	
h m		' "		' "		' "		h m	
1	12	-51 29	-51 19	-51 10	-51 00	-50 51	-50 41	22	48
	15	51 15	51 05	50 56	50 47	50 37	50 28		45
	18	51 01	50 51	50 42	50 33	50 23	50 14		42
	21	50 46	50 37	50 27	50 18	50 09	49 59		39
	24	50 31	50 22	50 12	50 03	49 54	49 44		36
1	27	-50 15	-50 06	-49 57	-49 47	-49 38	-49 29	22	33
	30	49 59	49 50	49 40	49 31	49 22	49 13		30
	33	49 42	49 33	49 24	49 15	49 05	48 56		27
	36	49 25	49 16	49 07	48 57	48 48	48 39		24
	39	49 07	48 58	48 49	48 40	48 31	48 22		21
1	42	-48 49	-48 40	-48 31	-48 22	-48 13	-48 04	22	18
	45	48 30	48 21	48 12	48 03	47 54	47 45		15
	48	48 11	48 02	47 53	47 44	47 35	47 26		12
	51	47 51	47 42	47 33	47 24	47 15	47 07		09
	54	47 30	47 22	47 13	47 04	46 55	46 47		06
1	57	-47 10	-47 01	-46 52	-46 43	-46 35	-46 26	22	03
	2 00	46 48	46 40	46 31	46 22	46 14	46 05		00
	03	46 26	46 18	46 09	46 01	45 52	45 44		57
	06	46 04	45 56	45 47	45 39	45 30	45 22		54
	09	45 41	45 33	45 25	45 16	45 08	44 59		51
2	12	-45 18	-45 10	-45 01	-44 53	-44 45	-44 36	21	48
	15	44 54	44 46	44 38	44 30	44 21	44 13		45
	18	44 30	44 22	44 14	44 06	43 57	43 49		42
	21	44 06	43 58	43 49	43 41	43 33	43 25		39
	24	43 41	43 32	43 24	43 16	43 08	43 00		36
2	27	-43 15	-43 07	-42 59	-42 51	-42 43	-42 35	21	33
	30	42 49	42 41	42 33	42 25	42 17	42 10		30
	33	42 23	42 15	42 07	41 59	41 51	41 44		27
	36	41 56	41 48	41 40	41 33	41 25	41 17		24
	39	41 28	41 21	41 13	41 05	40 58	40 50		21
2	42	-41 01	-40 53	-40 46	-40 38	-40 30	-40 23	21	18
	45	40 32	40 25	40 18	40 10	40 03	39 55		15
	48	40 04	39 56	39 49	39 42	39 34	39 27		12
	51	39 35	39 28	39 20	39 13	39 06	38 58		09
	54	39 05	38 58	38 51	38 44	38 37	38 30		06
2	57	-38 36	-38 29	-38 21	-38 14	-38 07	-38 00	21	03
	3 00	38 05	37 58	37 51	37 44	37 37	37 30		00
	03	37 35	37 28	37 21	37 14	37 07	37 00		57
	06	37 04	36 57	36 50	36 43	36 37	36 30		54
	09	36 32	36 26	36 19	36 12	36 06	35 59		51
3	12	-36 01	-35 54	-35 47	-35 41	-35 34	-35 28	20	48
	15	35 28	35 22	35 15	35 09	35 02	34 56		45
	18	34 56	34 50	34 43	34 37	34 30	34 24		42
	21	34 23	34 17	34 11	34 04	33 58	33 52		39
	24	33 50	33 44	33 38	33 31	33 25	33 19		36
3	27	-33 16	-33 10	-33 04	-32 58	-32 52	-32 46	20	33
	30	32 42	32 36	32 30	32 24	32 18	32 13		30
	33	32 08	32 02	31 56	31 51	31 45	31 39		27
	36	31 34	31 28	31 22	31 16	31 11	31 05		24
	39	30 59	30 53	30 47	30 42	30 36	30 30		21
3	42	-30 24	-30 18	-30 12	-30 07	-30 01	-29 56	20	18
	45	29 48	29 43	29 37	29 32	29 26	29 21		15
	48	29 12	29 07	29 01	28 56	28 51	28 45		12
	51	28 36	28 31	28 26	28 20	28 15	28 10		09
	54	28 00	27 54	27 49	27 44	27 39	27 34		06
3	57	-27 23	-27 18	-27 13	-27 08	-27 03	-26 58	20	03
	4 00	26 46	26 41	26 36	26 31	26 26	26 21		00
	03	26 09	26 04	25 59	25 54	25 50	25 45		57
	06	25 31	25 26	25 22	25 17	25 12	25 08		54
	4 09	-24 53	-24 49	-24 44	-24 40	-24 35	-24 31		19 51

POLARIS, 1965

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE

Decl. H.A.	89°05'50"	89°06'00"	89°06'10"	89°06'20"	89°06'30"	89°06'40"	Decl. H.A.
h m	' "	' "	' "	' "	' "	' "	h m
4 09	-24 53	-24 49	-24 44	-24 40	-24 35	-24 31	19 51
12	24 15	24 11	24 06	24 02	23 58	23 53	48
15	23 37	23 33	23 28	23 24	23 20	23 15	45
18	22 58	22 54	22 50	22 46	22 42	22 37	42
21	22 20	22 16	22 11	22 07	22 03	21 59	39
4 24	-21 41	-21 37	-21 33	-21 29	-21 25	-21 21	19 36
27	21 01	20 58	20 54	20 50	20 46	20 42	33
30	20 22	20 18	20 15	20 11	20 07	20 03	30
33	19 42	19 39	19 35	19 32	19 28	19 24	27
36	19 02	18 59	18 56	18 52	18 49	18 45	24
4 39	-18 22	-18 19	-18 16	-18 12	-18 09	-18 06	19 21
42	17 42	17 39	17 36	17 33	17 29	17 26	18
45	17 02	16 59	16 56	16 53	16 49	16 46	15
48	16 21	16 18	16 15	16 12	16 09	16 06	12
51	15 40	15 38	15 35	15 32	15 29	15 26	09
4 54	-15 00	-14 57	-14 54	-14 51	-14 49	-14 46	19 06
4 57	14 19	14 16	14 13	14 11	14 08	14 06	03
5 00	13 37	13 35	13 32	13 30	13 28	13 25	19 00
03	12 56	12 54	12 51	12 49	12 47	12 44	18 57
06	12 15	12 12	12 10	12 08	12 06	12 04	54
5 09	-11 33	-11 31	-11 29	-11 27	-11 25	-11 23	18 51
12	10 51	10 49	10 47	10 45	10 44	10 42	48
15	10 09	10 08	10 06	10 04	10 02	10 00	45
18	9 28	9 26	9 24	9 23	9 21	9 19	42
21	8 46	8 44	8 42	8 41	8 39	8 38	39
5 24	- 8 03	- 8 02	- 8 01	- 7 59	- 7 58	- 7 56	18 36
27	7 21	7 20	7 19	7 17	7 16	7 15	33
30	6 39	6 38	6 37	6 36	6 34	6 33	30
33	5 57	5 56	5 55	5 54	5 53	5 52	27
36	5 14	5 14	5 13	5 12	5 11	5 10	24
5 39	- 4 32	- 4 31	- 4 30	- 4 30	- 4 29	- 4 28	18 21
42	3 50	3 49	3 48	3 48	3 47	3 46	18
45	3 07	3 07	3 06	3 06	3 05	3 05	15
48	2 25	2 24	2 24	2 23	2 23	2 23	12
51	1 42	1 42	1 42	1 41	1 41	1 41	09
5 54	- 0 59	- 0 59	- 0 59	- 0 59	- 0 59	- 0 59	18 06
5 57	- 0 17	- 0 17	- 0 17	- 0 17	- 0 17	- 0 17	03
6 00	+ 0 26	+ 0 25	+ 0 25	+ 0 25	+ 0 25	+ 0 25	18 00
03	1 08	1 08	1 08	1 07	1 07	1 07	17 57
06	1 51	1 50	1 50	1 49	1 49	1 49	54
6 09	+ 2 33	+ 2 33	+ 2 32	+ 2 32	+ 2 31	+ 2 30	17 51
12	3 16	3 15	3 14	3 14	3 13	3 12	48
15	3 58	3 57	3 56	3 56	3 55	3 54	45
18	4 40	4 40	4 39	4 38	4 37	4 36	42
21	5 23	5 22	5 21	5 20	5 19	5 17	39
6 24	+ 6 05	+ 6 04	+ 6 03	+ 6 01	+ 6 00	+ 5 59	17 36
27	6 47	6 46	6 45	6 43	6 42	6 41	33
30	7 29	7 28	7 27	7 25	7 24	7 22	30
33	8 11	8 10	8 08	8 07	8 05	8 04	27
36	8 53	8 52	8 50	8 48	8 47	8 45	24
6 39	+ 9 35	+ 9 33	+ 9 32	+ 9 30	+ 9 28	+ 9 26	17 21
42	10 17	10 15	10 13	10 11	10 09	10 07	18
45	10 59	10 57	10 55	10 52	10 50	10 48	15
48	11 40	11 38	11 36	11 34	11 31	11 29	12
51	12 22	12 19	12 17	12 15	12 12	12 10	09
6 54	+13 03	+13 00	+12 58	+12 56	+12 53	+12 51	17 06
6 57	13 44	13 42	13 39	13 36	13 34	13 31	03
7 00	14 25	14 22	14 20	14 17	14 14	14 11	17 00
03	15 06	15 03	15 00	14 57	14 55	14 52	16 57
7 06	+15 47	+15 44	+15 41	+15 38	+15 35	+15 32	16 54

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FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE

Decl. H.A.		89°05'50"	89°06'00"	89°06'10"	89°06'20"	89°06'30"	89°06'40"	Decl. H.A.
h m								h m
7	06	+15 47	+15 44	+15 41	+15 38	+15 35	+15 32	16 54
	09	16 27	16 24	16 21	16 18	16 15	16 12	51
	12	17 08	17 04	17 01	16 58	16 55	16 51	48
	15	17 48	17 44	17 41	17 38	17 34	17 31	45
	18	18 28	18 24	18 21	18 17	18 14	18 10	42
7	21	+19 08	+19 04	+19 00	+18 57	+18 53	+18 50	16 39
	24	19 47	19 43	19 40	19 36	19 32	19 29	36
	27	20 26	20 23	20 19	20 15	20 11	20 07	33
	30	21 06	21 02	20 58	20 54	20 50	20 46	30
	33	21 45	21 41	21 36	21 32	21 28	21 24	27
7	36	+22 23	+22 19	+22 15	+22 11	+22 07	+22 02	16 24
	39	23 02	22 58	22 53	22 49	22 45	22 40	21
	42	23 40	23 36	23 31	23 27	23 22	23 18	18
	45	24 18	24 14	24 09	24 04	24 00	23 55	15
	48	24 56	24 51	24 47	24 42	24 37	24 33	12
7	51	+25 33	+25 29	+25 24	+25 19	+25 14	+25 10	16 09
	54	26 11	26 06	26 01	25 56	25 51	25 46	06
7	57	26 48	26 43	26 38	26 33	26 28	26 23	03
8	00	27 24	27 19	27 14	27 09	27 04	26 59	16 00
	03	28 01	27 55	27 50	27 45	27 40	27 35	15 57
8	06	+28 37	+28 32	+28 26	+28 21	+28 15	+28 10	15 54
	09	29 13	29 07	29 02	28 56	28 51	28 45	51
	12	29 48	29 43	29 37	29 32	29 26	29 20	48
	15	30 23	30 18	30 12	30 06	30 01	29 55	45
	18	30 58	30 53	30 47	30 41	30 35	30 29	42
8	21	+31 33	+31 27	+31 21	+31 15	+31 09	+31 04	15 39
	24	32 07	32 01	31 55	31 49	31 43	31 37	36
	27	32 41	32 35	32 29	32 23	32 17	32 11	33
	30	33 15	33 09	33 02	32 56	32 50	32 44	30
	33	33 48	33 42	33 35	33 29	33 23	33 17	27
8	36	+34 21	+34 14	+34 08	+34 02	+33 55	+33 49	15 24
	39	34 53	34 47	34 40	34 34	34 27	34 21	21
	42	35 26	35 19	35 12	35 06	34 59	34 53	18
	45	35 57	35 51	35 44	35 37	35 31	35 24	15
	48	36 29	36 22	36 15	36 09	36 02	35 55	12
8	51	+37 00	+36 53	+36 46	+36 39	+36 33	+36 26	15 09
	54	37 31	37 24	37 17	37 10	37 03	36 56	06
8	57	38 01	37 54	37 47	37 40	37 33	37 26	03
9	00	38 31	38 24	38 17	38 10	38 02	37 55	15 00
	03	39 01	38 53	38 46	38 39	38 32	38 24	14 57
9	06	+39 30	+39 22	+39 15	+39 08	+39 00	+38 53	14 54
	09	39 58	39 51	39 44	39 36	39 29	39 21	51
	12	40 27	40 19	40 12	40 04	39 57	39 49	48
	15	40 55	40 47	40 40	40 32	40 24	40 17	45
	18	41 22	41 15	41 07	40 59	40 52	40 44	42
9	21	+41 49	+41 42	+41 34	+41 26	+41 18	+41 11	14 39
	24	42 16	42 08	42 00	41 52	41 45	41 37	36
	27	42 42	42 34	42 26	42 18	42 11	42 03	33
	30	43 08	43 00	42 52	42 44	42 36	42 28	30
	33	43 33	43 25	43 17	43 09	43 01	42 53	27
9	36	+43 58	+43 50	+43 42	+43 34	+43 26	+43 18	14 24
	39	44 23	44 14	44 06	43 58	43 50	43 42	21
	42	44 47	44 38	44 30	44 22	44 14	44 05	18
	45	45 10	45 02	44 54	44 45	44 37	44 28	15
	48	45 33	45 25	45 16	45 08	45 00	44 51	12
9	51	+45 56	+45 47	+45 39	+45 30	+45 22	+45 13	14 09
	54	46 18	46 10	46 01	45 52	45 44	45 35	06
9	57	46 40	46 31	46 23	46 14	46 05	45 57	03
10	00	47 01	46 52	46 44	46 35	46 26	46 18	14 00
10	03	+47 22	+47 13	+47 04	+46 55	+46 47	+46 38	13 57

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FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE

Decl. H.A.		89°05'50"	89°06'00"	89°06'10"	89°06'20"	89°06'30"	89°06'40"	Decl. H.A.	
h	m							h	m
10	03	+47 22	+47 13	+47 04	+46 55	+46 47	+46 38	13	57
	06	47 42	47 33	47 24	47 16	47 07	46 58		54
	09	48 02	47 53	47 44	47 35	47 26	47 17		51
	12	48 21	48 12	48 03	47 54	47 45	47 36		48
	15	48 40	48 31	48 22	48 13	48 04	47 55		45
10	18	+48 58	+48 49	+48 40	+48 31	+48 22	+48 13	13	42
	21	49 16	49 07	48 58	48 49	48 40	48 30		39
	24	49 33	49 24	49 15	49 06	48 57	48 47		36
	27	49 50	49 41	49 32	49 22	49 13	49 04		33
	30	50 06	49 57	49 48	49 39	49 29	49 20		30
10	33	+50 22	+50 13	+50 04	+49 54	+49 45	+49 36	13	27
	36	50 37	50 28	50 19	50 09	50 00	49 51		24
	39	50 52	50 43	50 33	50 24	50 15	50 05		21
	42	51 06	50 57	50 48	50 38	50 29	50 19		18
	45	51 20	51 11	51 01	50 52	50 42	50 33		15
10	48	+51 33	+51 24	+51 14	+51 05	+50 55	+50 46	13	12
	51	51 46	51 37	51 27	51 17	51 08	50 58		09
	54	51 58	51 49	51 39	51 29	51 20	51 10		06
10	57	52 10	52 00	51 51	51 41	51 31	51 22		03
11	00	52 21	52 11	52 02	51 52	51 42	51 33	13	00
11	03	+52 32	+52 22	+52 12	+52 02	+51 53	+51 43	12	57
	06	52 42	52 32	52 22	52 12	52 03	51 53		54
	09	52 51	52 41	52 32	52 22	52 12	52 02		51
	12	53 00	52 50	52 41	52 31	52 21	52 11		48
	15	53 09	52 59	52 49	52 39	52 29	52 19		45
11	18	+53 16	+53 07	+52 57	+52 47	+52 37	+52 27	12	42
	21	53 24	53 14	53 04	52 54	52 44	52 34		39
	24	53 31	53 21	53 11	53 01	52 51	52 41		36
	27	53 37	53 27	53 17	53 07	52 57	52 47		33
	30	53 43	53 33	53 23	53 13	53 03	52 53		30
11	33	+53 48	+53 38	+53 28	+53 18	+53 08	+52 58	12	27
	36	53 52	53 43	53 33	53 23	53 13	53 03		24
	39	53 57	53 47	53 37	53 27	53 17	53 07		21
	42	54 00	53 50	53 40	53 30	53 20	53 10		18
	45	54 03	53 53	53 43	53 33	53 23	53 13		15
11	48	+54 06	+53 56	+53 46	+53 36	+53 26	+53 16	12	12
	51	54 08	53 58	53 48	53 38	53 28	53 18		09
	54	54 09	53 59	53 49	53 39	53 29	53 19		06
11	57	54 10	54 00	53 50	53 40	53 30	53 20		03
12	00	+54 10	+54 00	+53 50	+53 40	+53 30	+53 20	12	00

AUXILIARY TABLE

The main table has been computed for an altitude of 45°. For other altitudes, corrections taken from the table below may be applied when the desired degree of accuracy requires it.

Altitude H.A.		10°	20°	30°	40°	50°	60°	70°	Altitude H.A.	
h	h								h	h
0	12	0	0	0	0	0	0	0	12	24
1	11	- 1	- 1	- 1	0	0	+ 1	+ 3	13	23
2	10	5	4	3	-1	+1	5	11	14	22
3	9	10	8	5	2	2	9	22	15	21
4	8	16	12	8	3	4	14	33	16	20
5	7	19	15	10	4	5	17	41	17	19
6	6	-21	-16	-11	-4	+5	+18	+44	18	18

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AZIMUTH AT ALL HOUR ANGLES

[For hour angles 0^h to 12^h Polaris is west of north, and for hour angles 12^h to 24^h it is east of north]

Lat.												Lat.	
H.A.		10°	15°	20°	22°	24°	26°	28°	30°	32°	H.A.		
h	m											h	m
0	00	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	24	00	
	10	0 02.4	0 02.4	0 02.5	0 02.5	0 02.6	0 02.6	0 02.7	0 02.7	0 02.8	23	50	
	20	0 04.8	0 04.9	0 05.0	0 05.1	0 05.2	0 05.2	0 05.3	0 05.4	0 05.6		40	
	30	0 07.1	0 07.3	0 07.5	0 07.6	0 07.7	0 07.8	0 08.0	0 08.2	0 08.3		30	
	40	0 09.5	0 09.7	0 10.0	0 10.1	0 10.3	0 10.4	0 10.6	0 10.9	0 11.1		20	
	50	0 11.8	0 12.1	0 12.4	0 12.6	0 12.8	0 13.0	0 13.3	0 13.5	0 13.8		10	
1	00	0 14.1	0 14.4	0 14.9	0 15.1	0 15.3	0 15.6	0 15.9	0 16.2	0 16.5	23	00	
	10	0 16.4	0 16.8	0 17.3	0 17.5	0 17.8	0 18.1	0 18.4	0 18.8	0 19.2	22	50	
	20	0 18.7	0 19.1	0 19.6	0 19.9	0 20.2	0 20.6	0 21.0	0 21.4	0 21.8		40	
	30	0 20.9	0 21.3	0 22.0	0 22.3	0 22.6	0 23.0	0 23.4	0 23.9	0 24.4		30	
	40	0 23.1	0 23.6	0 24.3	0 24.6	0 25.0	0 25.4	0 25.9	0 26.4	0 27.0		20	
	50	0 25.2	0 25.7	0 26.5	0 26.9	0 27.3	0 27.8	0 28.3	0 28.8	0 29.5		10	
2	00	0 27.3	0 27.9	0 28.7	0 29.1	0 29.6	0 30.1	0 30.6	0 31.2	0 31.9	22	00	
	10	0 29.3	0 30.0	0 30.8	0 31.3	0 31.7	0 32.3	0 32.9	0 33.6	0 34.3	21	50	
	20	0 31.3	0 32.0	0 32.9	0 33.4	0 33.9	0 34.5	0 35.1	0 35.8	0 36.6		40	
	30	0 33.2	0 33.9	0 34.9	0 35.4	0 36.0	0 36.6	0 37.2	0 38.0	0 38.8		30	
	40	0 35.1	0 35.8	0 36.9	0 37.4	0 38.0	0 38.6	0 39.3	0 40.1	0 41.0		20	
	50	0 36.9	0 37.7	0 38.7	0 39.3	0 39.9	0 40.6	0 41.3	0 42.1	0 43.1		10	
3	00	0 38.6	0 39.4	0 40.5	0 41.1	0 41.7	0 42.5	0 43.2	0 44.1	0 45.1	21	00	
	10	0 40.2	0 41.1	0 42.3	0 42.9	0 43.5	0 44.3	0 45.1	0 46.0	0 47.0	20	50	
	20	0 41.8	0 42.7	0 43.9	0 44.5	0 45.2	0 46.0	0 46.8	0 47.7	0 48.8		40	
	30	0 43.3	0 44.2	0 45.5	0 46.1	0 46.8	0 47.6	0 48.5	0 49.4	0 50.5		30	
	40	0 44.7	0 45.6	0 46.9	0 47.6	0 48.3	0 49.1	0 50.0	0 51.0	0 52.1		20	
	50	0 46.0	0 47.0	0 48.3	0 49.0	0 49.7	0 50.6	0 51.5	0 52.5	0 53.7		10	
4	00	0 47.3	0 48.2	0 49.6	0 50.3	0 51.0	0 51.9	0 52.9	0 53.9	0 55.1	20	00	
	10	0 48.4	0 49.4	0 50.8	0 51.5	0 52.3	0 53.1	0 54.1	0 55.2	0 56.4	19	50	
	20	0 49.4	0 50.4	0 51.9	0 52.6	0 53.4	0 54.3	0 55.3	0 56.4	0 57.6		40	
	30	0 50.4	0 51.4	0 52.9	0 53.6	0 54.4	0 55.3	0 56.3	0 57.4	0 58.7		30	
	40	0 51.3	0 52.3	0 53.8	0 54.5	0 55.3	0 56.3	0 57.3	0 58.4	0 59.7		20	
	50	0 52.0	0 53.1	0 54.6	0 55.3	0 56.1	0 57.1	0 58.1	0 59.3	1 00.5		10	
5	00	0 52.7	0 53.7	0 55.2	0 56.0	0 56.8	0 57.8	0 58.8	1 00.0	1 01.3	19	00	
	10	0 53.2	0 54.3	0 55.8	0 56.6	0 57.4	0 58.4	0 59.4	1 00.6	1 01.9	18	50	
	20	0 53.7	0 54.8	0 56.3	0 57.1	0 57.9	0 58.9	0 59.9	1 01.1	1 02.4		40	
	30	0 54.0	0 55.1	0 56.7	0 57.4	0 58.3	0 59.3	1 00.3	1 01.5	1 02.8		30	
	40	0 54.3	0 55.4	0 56.9	0 57.7	0 58.6	0 59.5	1 00.6	1 01.8	1 03.1		20	
	50	0 54.4	0 55.5	0 57.1	0 57.8	0 58.7	0 59.7	1 00.7	1 01.9	1 03.2		10	
6	00	0 54.5	0 55.6	0 57.1	0 57.9	0 58.7	0 59.7	1 00.8	1 02.0	1 03.3	18	00	
	10	0 54.4	0 55.5	0 57.0	0 57.8	0 58.7	0 59.6	1 00.7	1 01.9	1 03.2	17	50	
	20	0 54.3	0 55.3	0 56.9	0 57.6	0 58.5	0 59.4	1 00.5	1 01.7	1 03.0		40	
	30	0 54.0	0 55.1	0 56.6	0 57.3	0 58.2	0 59.1	1 00.2	1 01.4	1 02.7		30	
	40	0 53.6	0 54.7	0 56.2	0 56.9	0 57.8	0 58.7	0 59.8	1 00.9	1 02.2		20	
	50	0 53.2	0 54.2	0 55.7	0 56.4	0 57.3	0 58.2	0 59.2	1 00.4	1 01.7		10	
7	00	0 52.6	0 53.6	0 55.1	0 55.8	0 56.6	0 57.6	0 58.6	0 59.7	1 01.0	17	00	
	10	0 51.9	0 52.9	0 54.4	0 55.1	0 55.9	0 56.8	0 57.8	0 58.9	1 00.2	16	50	
	20	0 51.2	0 52.1	0 53.6	0 54.3	0 55.1	0 56.0	0 57.0	0 58.1	0 59.3		40	
	30	0 50.3	0 51.2	0 52.6	0 53.3	0 54.1	0 55.0	0 56.0	0 57.1	0 58.2		30	
	40	0 49.3	0 50.3	0 51.6	0 52.3	0 53.1	0 53.9	0 54.9	0 55.9	0 57.1		20	
	50	0 48.3	0 49.2	0 50.5	0 51.2	0 51.9	0 52.8	0 53.7	0 54.7	0 55.9		10	
8	00	0 47.1	0 48.0	0 49.3	0 50.0	0 50.7	0 51.5	0 52.4	0 53.4	0 54.5	16	00	
	10	0 45.9	0 46.8	0 48.0	0 48.6	0 49.4	0 50.1	0 51.0	0 52.0	0 53.1	15	50	
	20	0 44.6	0 45.4	0 46.6	0 47.2	0 47.9	0 48.7	0 49.5	0 50.5	0 51.5		40	
	30	0 43.2	0 44.0	0 45.2	0 45.7	0 46.4	0 47.1	0 48.0	0 48.9	0 49.9		30	
	40	0 41.7	0 42.4	0 43.6	0 44.2	0 44.8	0 45.5	0 46.3	0 47.2	0 48.2		20	
	50	0 40.1	0 40.8	0 41.9	0 42.5	0 43.1	0 43.8	0 44.6	0 45.4	0 46.4		10	
9	00	0 38.5	0 39.2	0 40.2	0 40.7	0 41.3	0 42.0	0 42.7	0 43.5	0 44.4	15	00	

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AZIMUTH AT ALL HOUR ANGLES

[For hour angles 0^h to 12^h Polaris is west of north, and for hour angles 12^h to 24^h it is east of north]

Lat. H.A.		10°	15°	20°	22°	24°	26°	28°	30°	32°	Lat. H.A.	
h	m										h	m
		°	'	°	'	°	'	°	'	°		
9	00	0 38.5	0 39.2	0 40.2	0 40.7	0 41.3	0 42.0	0 42.7	0 43.5	0 44.4	15	00
	10	0 36.7	0 37.4	0 38.4	0 38.9	0 39.5	0 40.1	0 40.8	0 41.6	0 42.4	14	50
	20	0 35.0	0 35.6	0 36.6	0 37.0	0 37.6	0 38.2	0 38.8	0 39.6	0 40.4		40
	30	0 33.1	0 33.7	0 34.6	0 35.1	0 35.6	0 36.1	0 36.8	0 37.5	0 38.2		30
	40	0 31.2	0 31.8	0 32.6	0 33.0	0 33.5	0 34.0	0 34.6	0 35.3	0 36.0		20
	50	0 29.2	0 29.7	0 30.5	0 30.9	0 31.4	0 31.9	0 32.4	0 33.0	0 33.7		10
10	00	0 27.2	0 27.7	0 28.4	0 28.8	0 29.2	0 29.7	0 30.2	0 30.7	0 31.4	14	00
	10	0 25.1	0 25.6	0 26.2	0 26.6	0 27.0	0 27.4	0 27.9	0 28.4	0 29.0	13	50
	20	0 23.0	0 23.4	0 24.0	0 24.3	0 24.7	0 25.1	0 25.5	0 26.0	0 26.5		40
	30	0 20.8	0 21.2	0 21.7	0 22.0	0 22.3	0 22.7	0 23.1	0 23.5	0 24.0		30
	40	0 18.6	0 18.9	0 19.4	0 19.7	0 20.0	0 20.3	0 20.6	0 21.0	0 21.4		20
	50	0 16.3	0 16.6	0 17.1	0 17.3	0 17.6	0 17.8	0 18.1	0 18.5	0 18.9		10
11	00	0 14.1	0 14.3	0 14.7	0 14.9	0 15.1	0 15.3	0 15.6	0 15.9	0 16.2	13	00
	10	0 11.8	0 12.0	0 12.3	0 12.5	0 12.6	0 12.8	0 13.1	0 13.3	0 13.6	12	50
	20	0 09.4	0 09.6	0 09.9	0 10.0	0 10.1	0 10.3	0 10.5	0 10.7	0 10.9		40
	30	0 07.1	0 07.2	0 07.4	0 07.5	0 07.6	0 07.7	0 07.9	0 08.0	0 08.2		30
	40	0 04.7	0 04.8	0 04.9	0 05.0	0 05.1	0 05.2	0 05.3	0 05.4	0 05.5		20
	50	0 02.4	0 02.4	0 02.5	0 02.5	0 02.5	0 02.6	0 02.6	0 02.7	0 02.7		10
12	00	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	12	00
Lat. H.A.		32°	34°	36°	38°	40°	42°	44°	46°	48°	Lat. H.A.	
h	m										h	m
		°	'	°	'	°	'	°	'	°		
0	00	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	24	00
	10	0 02.8	0 02.9	0 02.9	0 03.0	0 03.1	0 03.2	0 03.3	0 03.4	0 03.6	23	50
	20	0 05.6	0 05.7	0 05.8	0 06.0	0 06.2	0 06.4	0 06.6	0 06.8	0 07.1		40
	30	0 08.3	0 08.5	0 08.8	0 09.0	0 09.3	0 09.6	0 09.9	0 10.2	0 10.7		30
	40	0 11.1	0 11.4	0 11.6	0 12.0	0 12.3	0 12.7	0 13.1	0 13.6	0 14.2		20
	50	0 13.8	0 14.2	0 14.5	0 14.9	0 15.4	0 15.8	0 16.4	0 17.0	0 17.7		10
1	00	0 16.5	0 16.9	0 17.4	0 17.8	0 18.4	0 18.9	0 19.6	0 20.3	0 21.1	23	00
	10	0 19.2	0 19.7	0 20.2	0 20.7	0 21.3	0 22.0	0 22.8	0 23.6	0 24.5	22	50
	20	0 21.8	0 22.4	0 22.9	0 23.6	0 24.3	0 25.0	0 25.9	0 26.8	0 27.9		40
	30	0 24.4	0 25.0	0 25.7	0 26.4	0 27.1	0 28.0	0 29.0	0 30.0	0 31.2		30
	40	0 27.0	0 27.6	0 28.3	0 29.1	0 30.0	0 30.9	0 32.0	0 33.1	0 34.4		20
	50	0 29.5	0 30.2	0 30.9	0 31.8	0 32.7	0 33.8	0 34.9	0 36.2	0 37.6		10
2	00	0 31.9	0 32.7	0 33.5	0 34.4	0 35.4	0 36.6	0 37.8	0 39.2	0 40.7	22	00
	10	0 34.3	0 35.1	0 36.0	0 37.0	0 38.1	0 39.3	0 40.6	0 42.1	0 43.7	21	50
	20	0 36.6	0 37.5	0 38.4	0 39.5	0 40.6	0 41.9	0 43.3	0 44.9	0 46.7		40
	30	0 38.8	0 39.7	0 40.7	0 41.9	0 43.1	0 44.5	0 46.0	0 47.6	0 49.5		30
	40	0 41.0	0 41.9	0 43.0	0 44.2	0 45.5	0 46.9	0 48.5	0 50.3	0 52.2		20
	50	0 43.1	0 44.1	0 45.2	0 46.4	0 47.8	0 49.3	0 51.0	0 52.8	0 54.9		10
3	00	0 45.1	0 46.1	0 47.3	0 48.6	0 50.0	0 51.6	0 53.3	0 55.3	0 57.4	21	00
	10	0 47.0	0 48.1	0 49.3	0 50.6	0 52.1	0 53.7	0 55.6	0 57.6	0 59.8	20	50
	20	0 48.8	0 49.9	0 51.2	0 52.6	0 54.1	0 55.8	0 57.7	0 59.8	1 02.1		40
	30	0 50.5	0 51.7	0 53.0	0 54.4	0 56.0	0 57.8	0 59.7	1 01.9	1 04.3		30
	40	0 52.1	0 53.3	0 54.7	0 56.2	0 57.8	0 59.6	1 01.6	1 03.9	1 06.4		20
	50	0 53.7	0 54.9	0 56.3	0 57.8	0 59.5	1 01.4	1 03.4	1 05.7	1 08.3		10
4	00	0 55.1	0 56.4	0 57.8	0 59.3	1 01.1	1 03.0	1 05.1	1 07.4	1 10.1	20	00
	10	0 56.4	0 57.7	0 59.1	1 00.7	1 02.5	1 04.5	1 06.6	1 09.0	1 11.7	19	50
	20	0 57.6	0 58.9	1 00.4	1 02.0	1 03.8	1 05.8	1 08.0	1 10.5	1 13.2		40
	30	0 58.7	1 00.0	1 01.5	1 03.2	1 05.0	1 07.1	1 09.3	1 11.8	1 14.6		30
	40	0 59.7	1 01.0	1 02.6	1 04.3	1 06.1	1 08.2	1 10.5	1 13.0	1 15.8		20
	50	1 00.5	1 01.9	1 03.5	1 05.2	1 07.1	1 09.2	1 11.5	1 14.0	1 16.9		10
5	00	1 01.3	1 02.7	1 04.3	1 06.0	1 07.9	1 10.0	1 12.3	1 14.9	1 17.8	19	00

POLARIS, 1965

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AZIMUTH AT ALL HOUR ANGLES

[For hour angles 0^h to 12^h Polaris is west of north, and for hour angles 12^h to 24^h it is east of north]

Lat.												Lat.	
H.A.		32°	34°	36°	38°	40°	42°	44°	46°	48°	H.A.		
h	m	°	'	°	'	°	'	°	'	°	'	h	m
5	00	1 01.3	1 02.7	1 04.3	1 06.0	1 07.9	1 10.0	1 12.3	1 14.9	1 17.8		19	00
	10	1 01.9	1 03.3	1 04.9	1 06.7	1 08.6	1 10.7	1 13.1	1 15.7	1 18.6		18	50
	20	1 02.4	1 03.9	1 05.5	1 07.2	1 09.1	1 11.3	1 13.7	1 16.3	1 19.2			40
	30	1 02.8	1 04.3	1 05.9	1 07.6	1 09.6	1 11.7	1 14.1	1 16.7	1 19.7			30
	40	1 03.1	1 04.5	1 06.1	1 07.9	1 09.9	1 12.0	1 14.4	1 17.1	1 20.0			20
	50	1 03.2	1 04.7	1 06.3	1 08.1	1 10.0	1 12.2	1 14.6	1 17.2	1 20.2			10
6	00	1 03.3	1 04.7	1 06.3	1 08.1	1 10.1	1 12.2	1 14.6	1 17.2	1 20.2		18	00
	10	1 03.2	1 04.6	1 06.2	1 08.0	1 09.9	1 12.1	1 14.5	1 17.1	1 20.1		17	50
	20	1 03.0	1 04.4	1 06.0	1 07.8	1 09.7	1 11.8	1 14.2	1 16.8	1 19.8			40
	30	1 02.7	1 04.1	1 05.7	1 07.4	1 09.3	1 11.5	1 13.8	1 16.4	1 19.3			30
	40	1 02.2	1 03.6	1 05.2	1 06.9	1 08.8	1 10.9	1 13.3	1 15.9	1 18.7			20
	50	1 01.7	1 03.0	1 04.6	1 06.3	1 08.2	1 10.3	1 12.6	1 15.2	1 18.0			10
7	00	1 01.0	1 02.4	1 03.9	1 05.6	1 07.4	1 09.5	1 11.8	1 14.3	1 17.1		17	00
	10	1 00.2	1 01.5	1 03.0	1 04.7	1 06.5	1 08.6	1 10.8	1 13.3	1 16.1		16	50
	20	0 59.3	1 00.6	1 02.1	1 03.7	1 05.5	1 07.5	1 09.7	1 12.2	1 14.9			40
	30	0 58.2	0 59.6	1 01.0	1 02.6	1 04.4	1 06.4	1 08.5	1 10.9	1 13.6			30
	40	0 57.1	0 58.4	0 59.8	1 01.4	1 03.1	1 05.1	1 07.2	1 09.5	1 12.2			20
	50	0 55.9	0 57.1	0 58.5	1 00.1	1 01.8	1 03.6	1 05.7	1 08.0	1 10.6			10
8	00	0 54.5	0 55.8	0 57.1	0 58.6	1 00.3	1 02.1	1 04.1	1 06.4	1 08.9		16	00
	10	0 53.1	0 54.3	0 55.6	0 57.1	0 58.7	1 00.4	1 02.4	1 04.6	1 07.0		15	50
	20	0 51.5	0 52.7	0 54.0	0 55.4	0 57.0	0 58.7	1 00.6	1 02.7	1 05.0			40
	30	0 49.9	0 51.0	0 52.3	0 53.6	0 55.1	0 56.8	0 58.6	1 00.7	1 03.0			30
	40	0 48.2	0 49.3	0 50.4	0 51.8	0 53.2	0 54.8	0 56.6	0 58.6	1 00.8			20
	50	0 46.4	0 47.4	0 48.5	0 49.8	0 51.2	0 52.7	0 54.5	0 56.3	0 58.4			10
9	00	0 44.4	0 45.4	0 46.5	0 47.7	0 49.1	0 50.6	0 52.2	0 54.0	0 56.0		15	00
	10	0 42.4	0 43.4	0 44.4	0 45.6	0 46.9	0 48.3	0 49.8	0 51.6	0 53.5		14	50
	20	0 40.4	0 41.3	0 42.3	0 43.4	0 44.6	0 45.9	0 47.4	0 49.1	0 50.9			40
	30	0 38.2	0 39.1	0 40.0	0 41.1	0 42.2	0 43.5	0 44.9	0 46.4	0 48.2			30
	40	0 36.0	0 36.8	0 37.7	0 38.7	0 39.8	0 41.0	0 42.3	0 43.7	0 45.4			20
	50	0 33.7	0 34.5	0 35.3	0 36.2	0 37.2	0 38.3	0 39.6	0 41.0	0 42.5			10
10	00	0 31.4	0 32.1	0 32.8	0 33.7	0 34.6	0 35.7	0 36.8	0 38.1	0 39.5		14	00
	10	0 29.0	0 29.6	0 30.3	0 31.1	0 32.0	0 32.9	0 34.0	0 35.2	0 36.5		13	50
	20	0 26.5	0 27.1	0 27.8	0 28.5	0 29.3	0 30.1	0 31.1	0 32.2	0 33.4			40
	30	0 24.0	0 24.5	0 25.1	0 25.8	0 26.5	0 27.3	0 28.2	0 29.1	0 30.2			30
	40	0 21.4	0 21.9	0 22.4	0 23.0	0 23.7	0 24.4	0 25.2	0 26.0	0 27.0			20
	50	0 18.9	0 19.3	0 19.7	0 20.2	0 20.8	0 21.4	0 22.1	0 22.9	0 23.7			10
11	00	0 16.2	0 16.6	0 17.0	0 17.4	0 17.9	0 18.4	0 19.0	0 19.7	0 20.4		13	00
	10	0 13.6	0 13.9	0 14.2	0 14.6	0 15.0	0 15.4	0 15.9	0 16.5	0 17.1		12	50
	20	0 10.9	0 11.1	0 11.4	0 11.7	0 12.0	0 12.4	0 12.8	0 13.2	0 13.7			40
	30	0 08.2	0 08.4	0 08.6	0 08.8	0 09.0	0 09.3	0 09.6	0 09.9	0 10.3			30
	40	0 05.5	0 05.6	0 05.7	0 05.9	0 06.0	0 06.2	0 06.4	0 06.6	0 06.9			20
	50	0 02.7	0 02.8	0 02.9	0 02.9	0 03.0	0 03.1	0 03.2	0 03.3	0 03.4			10
12	00	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0		12	00
Lat.												Lat.	
H.A.		48°	50°	52°	54°	56°	58°	60°	61°	62°	H.A.		
h	m	°	'	°	'	°	'	°	'	°	'	h	m
0	00	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0		24	00
	10	0 03.6	0 03.7	0 03.9	0 04.1	0 04.3	0 04.5	0 04.8	0 05.0	0 05.1		23	50
	20	0 07.1	0 07.4	0 07.8	0 08.1	0 08.6	0 09.0	0 09.6	0 09.9	0 10.3			40
	30	0 10.7	0 11.1	0 11.6	0 12.2	0 12.8	0 13.6	0 14.4	0 14.9	0 15.4			30
	40	0 14.2	0 14.8	0 15.4	0 16.2	0 17.1	0 18.0	0 19.1	0 19.8	0 20.4			20
	50	0 17.7	0 18.4	0 19.2	0 20.2	0 21.3	0 22.5	0 23.9	0 24.6	0 25.5			10
1	00	0 21.1	0 22.0	0 23.0	0 24.1	0 25.4	0 26.9	0 28.5	0 29.4	0 30.5		23	00

AZIMUTH AT ALL HOUR ANGLES

[For hour angles 0^h to 12^h Polaris is west of north, and for hour angles 12^h to 24^h it is east of north]

Lat. H.A.		48°	50°	52°	54°	56°	58°	60°	61°	62°	Lat. H.A.	
h m		°	′	°	′	°	′	°	′	°	h m	
1	00	0 21.1	0 22.0	0 23.0	0 24.1	0 25.4	0 26.9	0 28.5	0 29.4	0 30.5	23	00
	10	0 24.5	0 25.6	0 26.7	0 28.0	0 29.5	0 31.2	0 33.1	0 34.2	0 35.4		50
	20	0 27.9	0 29.1	0 30.4	0 31.9	0 33.6	0 35.5	0 37.7	0 38.9	0 40.2		40
	30	0 31.2	0 32.5	0 34.0	0 35.6	0 37.5	0 39.7	0 42.1	0 43.5	0 45.0		30
	40	0 34.4	0 35.9	0 37.5	0 39.4	0 41.4	0 43.8	0 46.5	0 48.0	0 49.6		20
	50	0 37.6	0 39.2	0 41.0	0 43.0	0 45.2	0 47.8	0 50.8	0 52.4	0 54.2		10
2	00	0 40.7	0 42.4	0 44.4	0 46.5	0 49.0	0 51.8	0 54.9	0 56.7	0 58.6	22	00
	10	0 43.7	0 45.6	0 47.6	0 50.0	0 52.6	0 55.6	0 59.0	1 00.9	1 03.0		50
	20	0 46.7	0 48.6	0 50.8	0 53.3	0 56.1	0 59.3	1 03.0	1 05.0	1 07.2		40
	30	0 49.5	0 51.6	0 53.9	0 56.5	0 59.5	1 02.9	1 06.8	1 08.9	1 11.2		30
	40	0 52.2	0 54.4	0 56.9	0 59.7	1 02.8	1 06.4	1 10.4	1 12.7	1 15.2		20
	50	0 54.9	0 57.2	0 59.8	1 02.7	1 06.0	1 09.7	1 14.0	1 16.4	1 18.9		10
3	00	0 57.4	0 59.8	1 02.5	1 05.6	1 09.0	1 12.9	1 17.4	1 19.9	1 22.5	21	00
	10	0 59.8	1 02.3	1 05.1	1 08.3	1 11.9	1 15.9	1 20.6	1 23.2	1 26.0		50
	20	1 02.1	1 04.7	1 07.6	1 10.9	1 14.6	1 18.8	1 23.7	1 26.3	1 29.2		40
	30	1 04.3	1 07.0	1 10.0	1 13.4	1 17.2	1 21.6	1 26.6	1 29.3	1 32.3		30
	40	1 06.4	1 09.1	1 12.2	1 15.7	1 19.7	1 24.2	1 29.3	1 32.1	1 35.2		20
	50	1 08.3	1 11.1	1 14.3	1 17.9	1 21.9	1 26.6	1 31.8	1 34.8	1 37.9		10
4	00	1 10.1	1 13.0	1 16.2	1 19.9	1 24.1	1 28.8	1 34.2	1 37.2	1 40.5	20	00
	10	1 11.7	1 14.7	1 18.0	1 21.8	1 26.0	1 30.9	1 36.4	1 39.5	1 42.8		50
	20	1 13.2	1 16.3	1 19.7	1 23.5	1 27.8	1 32.7	1 38.4	1 41.5	1 44.9		40
	30	1 14.6	1 17.7	1 21.1	1 25.0	1 29.4	1 34.4	1 40.2	1 43.4	1 46.8		30
	40	1 15.8	1 18.9	1 22.5	1 26.4	1 30.9	1 36.0	1 41.8	1 45.0	1 48.5		20
	50	1 16.9	1 20.1	1 23.6	1 27.6	1 32.2	1 37.3	1 43.2	1 46.4	1 50.0		10
5	00	1 17.8	1 21.0	1 24.6	1 28.7	1 33.2	1 38.4	1 44.4	1 47.7	1 51.2	19	00
	10	1 18.6	1 21.8	1 25.5	1 29.5	1 34.2	1 39.4	1 45.4	1 48.7	1 52.3		50
	20	1 19.2	1 22.5	1 26.1	1 30.2	1 34.9	1 40.1	1 46.2	1 49.5	1 53.1		40
	30	1 19.7	1 23.0	1 26.6	1 30.8	1 35.4	1 40.7	1 46.8	1 50.1	1 53.7		30
	40	1 20.0	1 23.3	1 27.0	1 31.1	1 35.8	1 41.1	1 47.1	1 50.5	1 54.1		20
	50	1 20.2	1 23.5	1 27.2	1 31.3	1 36.0	1 41.3	1 47.3	1 50.7	1 54.3		10
6	00	1 20.2	1 23.5	1 27.2	1 31.3	1 36.0	1 41.3	1 47.3	1 50.7	1 54.3	18	00
	10	1 20.1	1 23.3	1 27.0	1 31.1	1 35.8	1 41.0	1 47.1	1 50.4	1 54.0		50
	20	1 19.8	1 23.0	1 26.7	1 30.8	1 35.4	1 40.6	1 46.6	1 50.0	1 53.6		40
	30	1 19.3	1 22.6	1 26.2	1 30.3	1 34.8	1 40.1	1 46.0	1 49.3	1 52.9		30
	40	1 18.7	1 21.9	1 25.5	1 29.6	1 34.1	1 39.3	1 45.2	1 48.5	1 52.0		20
	50	1 18.0	1 21.2	1 24.7	1 28.7	1 33.2	1 38.3	1 44.2	1 47.4	1 50.9		10
7	00	1 17.1	1 20.3	1 23.8	1 27.7	1 32.1	1 37.2	1 42.9	1 46.1	1 49.6	17	00
	10	1 16.1	1 19.2	1 22.6	1 26.5	1 30.9	1 35.8	1 41.5	1 44.7	1 48.0		50
	20	1 14.9	1 18.0	1 21.3	1 25.2	1 29.5	1 34.3	1 39.9	1 43.0	1 46.3		40
	30	1 13.6	1 16.6	1 19.9	1 23.7	1 27.9	1 32.7	1 38.1	1 41.2	1 44.4		30
	40	1 12.2	1 15.1	1 18.3	1 22.0	1 26.1	1 30.8	1 36.2	1 39.1	1 42.3		20
	50	1 10.6	1 13.4	1 16.6	1 20.2	1 24.2	1 28.8	1 34.0	1 36.9	1 40.0		10
8	00	1 08.9	1 11.6	1 14.7	1 18.2	1 22.2	1 26.6	1 31.7	1 34.5	1 37.5	16	00
	10	1 07.0	1 09.7	1 12.7	1 16.1	1 19.9	1 24.3	1 29.2	1 32.0	1 34.9		50
	20	1 05.0	1 07.7	1 10.6	1 13.9	1 17.6	1 21.8	1 26.6	1 29.2	1 32.1		40
	30	1 03.0	1 05.5	1 08.3	1 11.5	1 15.1	1 19.1	1 23.8	1 26.3	1 29.1		30
	40	1 00.8	1 03.2	1 05.9	1 09.0	1 12.4	1 16.3	1 20.8	1 23.3	1 25.9		20
	50	0 58.4	1 00.8	1 03.4	1 06.3	1 09.7	1 13.4	1 17.7	1 20.1	1 22.6		10
9	00	0 56.0	0 58.3	1 00.8	1 03.6	1 06.8	1 10.4	1 14.5	1 16.7	1 19.2	15	00
	10	0 53.5	0 55.6	0 58.0	1 00.7	1 03.7	1 07.2	1 11.1	1 13.3	1 15.6		50
	20	0 50.9	0 52.9	0 55.2	0 57.7	1 00.6	1 03.9	1 07.6	1 09.6	1 11.9		40
	30	0 48.2	0 50.1	0 52.2	0 54.6	0 57.4	1 00.5	1 04.0	1 05.9	1 08.0		30
	40	0 45.4	0 47.2	0 49.2	0 51.5	0 54.0	0 56.9	1 00.2	1 02.1	1 04.0		20
	50	0 42.5	0 44.2	0 46.1	0 48.2	0 50.6	0 53.3	0 56.4	0 58.1	0 59.9		10
10	00	0 39.5	0 41.1	0 42.8	0 44.8	0 47.0	0 49.6	0 52.4	0 54.0	0 55.7	14	00

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AZIMUTH AT ALL HOUR ANGLES

[For hour angles 0^h to 12^h Polaris is west of north, and for hour angles 12^h to 24^h it is east of north]

Lat. H.A.		48°	50°	52°	54°	56°	58°	60°	61°	62°	Lat. H.A.	
h m		°	°	°	°	°	°	°	°	°	h m	
10	00	0 39.5	0 41.1	0 42.8	0 44.8	0 47.0	0 49.6	0 52.4	0 54.0	0 55.7	14	00
	10	0 36.5	0 37.9	0 39.5	0 41.4	0 43.4	0 45.7	0 48.4	0 49.9	0 51.4	13	50
	20	0 33.4	0 34.7	0 36.2	0 37.8	0 39.7	0 41.9	0 44.3	0 45.6	0 47.1		40
	30	0 30.2	0 31.4	0 32.8	0 34.3	0 36.0	0 37.9	0 40.1	0 41.3	0 42.6		30
	40	0 27.0	0 28.1	0 29.3	0 30.6	0 32.1	0 33.8	0 35.8	0 36.9	0 38.0		20
	50	0 23.7	0 24.7	0 25.7	0 26.9	0 28.2	0 29.7	0 31.5	0 32.4	0 33.4		10
11	00	0 20.4	0 21.2	0 22.1	0 23.1	0 24.3	0 25.6	0 27.1	0 27.9	0 28.8	13	00
	10	0 17.1	0 17.7	0 18.5	0 19.4	0 20.3	0 21.4	0 22.6	0 23.3	0 24.0	12	50
	20	0 13.7	0 14.2	0 14.8	0 15.5	0 16.3	0 17.2	0 18.2	0 18.7	0 19.3		40
	30	0 10.3	0 10.7	0 11.2	0 11.7	0 12.2	0 12.9	0 13.6	0 14.1	0 14.5		30
	40	0 06.9	0 07.1	0 07.4	0 07.8	0 08.2	0 08.6	0 09.1	0 09.4	0 09.7		20
	50	0 03.4	0 03.6	0 03.7	0 03.9	0 04.1	0 04.3	0 04.6	0 04.7	0 04.8		10
12	00	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	12	00
Lat. H.A.		62°	63°	64°	65°	66°	67°	68°	69°	70°	Lat. H.A.	
h m		°	°	°	°	°	°	°	°	°	h m	
0	00	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	24	00
	10	0 05.1	0 05.3	0 05.5	0 05.7	0 06.0	0 06.2	0 06.5	0 06.8	0 07.1	23	50
	20	0 10.3	0 10.6	0 11.0	0 11.4	0 11.9	0 12.4	0 13.0	0 13.6	0 14.3		40
	30	0 15.4	0 15.9	0 16.5	0 17.1	0 17.8	0 18.6	0 19.4	0 20.4	0 21.4		30
	40	0 20.4	0 21.2	0 21.9	0 22.8	0 23.7	0 24.7	0 25.9	0 27.1	0 28.4		20
	50	0 25.5	0 26.4	0 27.3	0 28.4	0 29.6	0 30.8	0 32.2	0 33.8	0 35.4		10
1	00	0 30.5	0 31.5	0 32.7	0 34.0	0 35.3	0 36.9	0 38.5	0 40.3	0 42.4	23	00
	10	0 35.4	0 36.6	0 38.0	0 39.4	0 41.0	0 42.8	0 44.7	0 46.8	0 49.2	22	50
	20	0 40.2	0 41.6	0 43.2	0 44.8	0 46.7	0 48.7	0 50.8	0 53.3	0 55.9		40
	30	0 45.0	0 46.6	0 48.3	0 50.1	0 52.2	0 54.4	0 56.9	0 59.5	1 02.5		30
	40	0 49.6	0 51.4	0 53.3	0 55.3	0 57.6	1 00.0	1 02.7	1 05.7	1 09.0		20
	50	0 54.2	0 56.1	0 58.2	1 00.4	1 02.9	1 05.6	1 08.5	1 11.7	1 15.3		10
2	00	0 58.6	1 00.7	1 03.0	1 05.4	1 08.0	1 10.9	1 14.1	1 17.6	1 21.5	22	00
	10	1 03.0	1 05.2	1 07.6	1 10.2	1 13.0	1 16.2	1 19.6	1 23.3	1 27.5	21	50
	20	1 07.2	1 09.5	1 12.1	1 14.9	1 17.9	1 21.2	1 24.8	1 28.8	1 33.3		40
	30	1 11.2	1 13.7	1 16.5	1 19.4	1 22.6	1 26.1	1 30.0	1 34.2	1 38.9		30
	40	1 15.2	1 17.8	1 20.7	1 23.8	1 27.1	1 30.8	1 34.9	1 39.3	1 44.3		20
	50	1 18.9	1 21.7	1 24.7	1 27.9	1 31.5	1 35.4	1 39.6	1 44.3	1 49.4		10
3	00	1 22.5	1 25.4	1 28.6	1 32.0	1 35.7	1 39.7	1 44.1	1 49.0	1 54.4	21	00
	10	1 26.0	1 29.0	1 32.2	1 35.8	1 39.6	1 43.8	1 48.4	1 53.5	1 59.1	20	50
	20	1 29.2	1 32.4	1 35.7	1 39.4	1 43.4	1 47.7	1 52.5	1 57.8	2 03.6		40
	30	1 32.3	1 35.5	1 39.0	1 42.8	1 46.9	1 51.4	1 56.4	2 01.8	2 07.8		30
	40	1 35.2	1 38.5	1 42.1	1 46.0	1 50.3	1 54.9	2 00.0	2 05.6	2 11.7		20
	50	1 37.9	1 41.3	1 45.0	1 49.0	1 53.4	1 58.1	2 03.3	2 09.1	2 15.4		10
4	00	1 40.5	1 43.9	1 47.7	1 51.8	1 56.3	2 01.1	2 06.5	2 12.3	2 18.8	20	00
	10	1 42.8	1 46.3	1 50.2	1 54.4	1 58.9	2 03.9	2 09.3	2 15.3	2 21.9	19	50
	20	1 44.9	1 48.5	1 52.4	1 56.7	2 01.3	2 06.4	2 11.9	2 18.0	2 24.8		40
	30	1 46.8	1 50.5	1 54.5	1 58.8	2 03.5	2 08.7	2 14.3	2 20.5	2 27.3		30
	40	1 48.5	1 52.2	1 56.3	2 00.7	2 05.4	2 10.7	2 16.4	2 22.6	2 29.6		20
	50	1 50.0	1 53.8	1 57.9	2 02.3	2 07.1	2 12.4	2 18.2	2 24.5	2 31.5		10
5	00	1 51.2	1 55.1	1 59.2	2 03.7	2 08.6	2 13.9	2 19.7	2 26.1	2 33.2	19	00
	10	1 52.3	1 56.1	2 00.3	2 04.8	2 09.8	2 15.1	2 21.0	2 27.4	2 34.5	18	50
	20	1 53.1	1 57.0	2 01.2	2 05.7	2 10.7	2 16.1	2 22.0	2 28.4	2 35.6		40
	30	1 53.7	1 57.6	2 01.8	2 06.4	2 11.4	2 16.8	2 22.7	2 29.2	2 36.3		30
	40	1 54.1	1 58.0	2 02.3	2 06.8	2 11.8	2 17.2	2 23.1	2 29.6	2 36.8		20
	50	1 54.3	1 58.2	2 02.4	2 07.0	2 12.0	2 17.4	2 23.3	2 29.8	2 37.0		10
6	00	1 54.3	1 58.2	2 02.4	2 06.9	2 11.9	2 17.3	2 23.2	2 29.7	2 36.8	18	00

POLARIS, 1965

AZIMUTH AT ALL HOUR ANGLES

[For hour angles 0^h to 12^h Polaris is west of north, and for hour angles 12^h to 24^h it is east of north]

Lat.												Lat.	
		62°	63°	64°	65°	66°	67°	68°	69°	70°			
H.A.												H.A.	
h	m	°	'	°	'	°	'	°	'	°	'	h	m
6	00	1 54.3	1 58.2	2 02.4	2 06.9	2 11.9	2 17.3	2 23.2	2 29.7	2 36.8		18	00
	10	1 54.0	1 57.9	2 02.1	2 06.6	2 11.6	2 16.9	2 22.8	2 29.3	2 36.4		17	50
	20	1 53.6	1 57.4	2 01.6	2 06.1	2 11.0	2 16.3	2 22.2	2 28.6	2 35.6			40
	30	1 52.9	1 56.7	2 00.8	2 05.3	2 10.2	2 15.5	2 21.3	2 27.6	2 34.6			30
	40	1 52.0	1 55.8	1 59.9	2 04.3	2 09.1	2 14.3	2 20.1	2 26.4	2 33.3			20
	50	1 50.9	1 54.6	1 58.7	2 03.0	2 07.8	2 13.0	2 18.6	2 24.9	2 31.7			10
7	00	1 49.6	1 53.3	1 57.2	2 01.6	2 06.3	2 11.4	2 16.9	2 23.1	2 29.8		17	00
	10	1 48.0	1 51.7	1 55.6	1 59.9	2 04.5	2 09.5	2 15.0	2 21.0	2 27.7		16	50
	20	1 46.3	1 49.9	1 53.8	1 57.9	2 02.5	2 07.4	2 12.8	2 18.7	2 25.2			40
	30	1 44.4	1 47.9	1 51.7	1 55.8	2 00.2	2 05.1	2 10.4	2 16.2	2 22.6			30
	40	1 42.3	1 45.7	1 49.4	1 53.4	1 57.8	2 02.5	2 07.7	2 13.4	2 19.6			20
	50	1 40.0	1 43.4	1 47.0	1 50.9	1 55.1	1 59.8	2 04.8	2 10.3	2 16.4			10
8	00	1 37.5	1 40.8	1 44.3	1 48.1	1 52.3	1 56.8	2 01.7	2 07.1	2 13.0		16	00
	10	1 34.9	1 38.1	1 41.5	1 45.2	1 49.2	1 53.6	1 58.3	2 03.6	2 09.3		15	50
	20	1 32.1	1 35.1	1 38.5	1 42.0	1 45.9	1 50.2	1 54.8	1 59.8	2 05.4			40
	30	1 29.1	1 32.0	1 35.3	1 38.7	1 42.5	1 46.6	1 51.0	1 55.9	2 01.3			30
	40	1 25.9	1 28.8	1 31.9	1 35.2	1 38.8	1 42.8	1 47.1	1 51.8	1 56.9			20
	50	1 22.6	1 25.4	1 28.3	1 31.5	1 35.0	1 38.8	1 42.9	1 47.4	1 52.4			10
9	00	1 19.2	1 21.8	1 24.6	1 27.7	1 31.0	1 34.6	1 38.6	1 42.9	1 47.7		15	00
	10	1 15.6	1 18.1	1 20.8	1 23.7	1 26.9	1 30.3	1 34.1	1 38.2	1 42.7		14	50
	20	1 11.9	1 14.2	1 16.8	1 19.6	1 22.6	1 25.9	1 29.4	1 33.3	1 37.6			40
	30	1 08.0	1 10.2	1 12.7	1 15.3	1 18.1	1 21.2	1 24.6	1 28.3	1 32.4			30
	40	1 04.0	1 06.1	1 08.4	1 10.9	1 13.6	1 16.5	1 19.6	1 23.1	1 26.9			20
	50	0 59.9	1 01.9	1 04.0	1 06.3	1 08.9	1 11.6	1 14.5	1 17.8	1 21.4			10
10	00	0 55.7	0 57.6	0 59.6	1 01.7	1 04.0	1 06.5	1 09.3	1 12.3	1 15.6		14	00
	10	0 51.4	0 53.1	0 55.0	0 56.9	0 59.1	1 01.4	1 04.0	1 06.7	1 09.8		13	50
	20	0 47.1	0 48.6	0 50.3	0 52.1	0 54.0	0 56.2	0 58.5	1 01.0	1 03.8			40
	30	0 42.6	0 44.0	0 45.5	0 47.1	0 48.9	0 50.8	0 52.9	0 55.2	0 57.8			30
	40	0 38.0	0 39.3	0 40.6	0 42.1	0 43.7	0 45.4	0 47.3	0 49.3	0 51.6			20
	50	0 33.4	0 34.5	0 35.7	0 37.0	0 38.4	0 39.9	0 41.5	0 43.4	0 45.3			10
11	00	0 28.8	0 29.7	0 30.7	0 31.8	0 33.0	0 34.3	0 35.7	0 37.3	0 39.0		13	00
	10	0 24.0	0 24.8	0 25.7	0 26.6	0 27.6	0 28.7	0 29.9	0 31.2	0 32.6		12	50
	20	0 19.3	0 19.9	0 20.6	0 21.3	0 22.1	0 23.0	0 24.0	0 25.0	0 26.1			40
	30	0 14.5	0 15.0	0 15.5	0 16.0	0 16.6	0 17.3	0 18.0	0 18.8	0 19.6			30
	40	0 09.7	0 10.0	0 10.3	0 10.7	0 11.1	0 11.5	0 12.0	0 12.5	0 13.1			20
	50	0 04.8	0 05.0	0 05.2	0 05.4	0 05.6	0 05.8	0 06.0	0 06.3	0 06.6			10
12	00	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0		12	00

AUXILIARY TABLE

The main table has been computed for a declination of $89^{\circ} 06' 20''$. For other declinations of Polaris the corrections given below should be applied to the Azimuth taken from the main table. When the argument, Decl., is on the left the correction is positive; when on the right the correction is negative.

[illegible]

POLARIS, 1965

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AZIMUTH AT ELONGATION

Decl. Lat.							Variations for—	
	89°05'50"	89°06'00"	89°06'10"	89°06'20"	89°06'30"	89°06'40"	1' of Lat.	1" of s
10 00	0 55 00.1	0 54 50.0	0 54 39.8	0 54 29.7	0 54 19.5	0 54 09.4	+0.17	-1.02
10 20	0 55 03.6	0 54 53.4	0 54 43.3	0 54 33.1	0 54 22.9	0 54 12.8	0.17	1.02
10 40	0 55 07.2	0 54 57.0	0 54 46.8	0 54 36.6	0 54 26.4	0 54 16.3	0.18	1.02
11 00	0 55 10.8	0 55 00.6	0 54 50.5	0 54 40.3	0 54 30.1	0 54 19.9	0.19	1.02
11 20	0 55 14.6	0 55 04.4	0 54 54.2	0 54 44.0	0 54 33.8	0 54 23.6	0.19	1.02
11 40	0 55 18.6	0 55 08.4	0 54 58.1	0 54 47.9	0 54 37.7	0 54 27.5	0.20	1.02
12 00	0 55 22.6	0 55 12.4	0 55 02.2	0 54 51.9	0 54 41.7	0 54 31.5	+0.20	-1.02
12 20	0 55 26.8	0 55 16.5	0 55 06.3	0 54 56.1	0 54 45.8	0 54 35.6	0.21	1.02
12 40	0 55 31.1	0 55 20.8	0 55 10.6	0 55 00.3	0 54 50.1	0 54 39.8	0.22	1.02
13 00	0 55 35.5	0 55 25.2	0 55 15.0	0 55 04.7	0 54 54.4	0 54 44.2	0.22	1.03
13 20	0 55 40.0	0 55 29.8	0 55 19.5	0 55 09.2	0 54 58.9	0 54 48.7	0.23	1.03
13 40	0 55 44.7	0 55 34.4	0 55 24.1	0 55 13.8	0 55 03.5	0 54 53.3	0.24	1.03
14 00	0 55 49.5	0 55 39.2	0 55 28.9	0 55 18.6	0 55 08.3	0 54 58.0	+0.24	-1.03
14 20	0 55 54.4	0 55 44.1	0 55 33.8	0 55 23.5	0 55 13.1	0 55 02.8	0.25	1.03
14 40	0 55 59.5	0 55 49.1	0 55 38.8	0 55 28.5	0 55 18.1	0 55 07.8	0.25	1.03
15 00	0 56 04.7	0 55 54.3	0 55 44.0	0 55 33.6	0 55 23.2	0 55 12.9	0.26	1.04
15 20	0 56 10.0	0 55 59.6	0 55 49.2	0 55 38.9	0 55 28.5	0 55 18.1	0.27	1.04
15 40	0 56 15.4	0 56 05.0	0 55 54.6	0 55 44.3	0 55 33.9	0 55 23.5	0.27	1.04
16 00	0 56 21.0	0 56 10.6	0 56 00.2	0 55 49.8	0 55 39.4	0 55 29.0	+0.28	-1.04
16 20	0 56 26.7	0 56 16.3	0 56 05.9	0 55 55.4	0 55 45.0	0 55 34.6	0.29	1.04
16 40	0 56 32.5	0 56 22.1	0 56 11.7	0 56 01.2	0 55 50.8	0 55 40.3	0.29	1.04
17 00	0 56 38.5	0 56 28.1	0 56 17.6	0 56 07.1	0 55 56.7	0 55 46.2	0.30	1.05
17 20	0 56 44.6	0 56 34.1	0 56 23.7	0 56 13.2	0 56 02.7	0 55 52.2	0.31	1.05
17 40	0 56 50.9	0 56 40.4	0 56 29.9	0 56 19.4	0 56 08.9	0 55 58.4	0.31	1.05
18 00	0 56 57.3	0 56 46.8	0 56 36.2	0 56 25.7	0 56 15.2	0 56 04.7	+0.32	-1.05
18 20	0 57 03.8	0 56 53.3	0 56 42.7	0 56 32.2	0 56 21.7	0 56 11.1	0.33	1.05
18 40	0 57 10.5	0 56 59.9	0 56 49.4	0 56 38.8	0 56 28.2	0 56 17.7	0.34	1.06
19 00	0 57 17.3	0 57 06.7	0 56 56.1	0 56 45.6	0 56 35.0	0 56 24.4	0.34	1.06
19 20	0 57 24.2	0 57 13.6	0 57 03.0	0 56 52.4	0 56 41.9	0 56 31.3	0.35	1.06
19 40	0 57 31.3	0 57 20.7	0 57 10.1	0 56 59.5	0 56 48.9	0 56 38.2	0.36	1.06
20 00	0 57 38.6	0 57 28.0	0 57 17.3	0 57 06.7	0 56 56.0	0 56 45.4	+0.36	-1.06
20 20	0 57 46.0	0 57 35.3	0 57 24.7	0 57 14.0	0 57 03.3	0 56 52.7	0.37	1.07
20 40	0 57 53.5	0 57 42.9	0 57 32.2	0 57 21.5	0 57 10.8	0 57 00.1	0.38	1.07
21 00	0 58 01.2	0 57 50.5	0 57 39.8	0 57 29.1	0 57 18.4	0 57 07.7	0.39	1.07
21 20	0 58 09.1	0 57 58.4	0 57 47.6	0 57 36.9	0 57 26.2	0 57 15.4	0.39	1.07
21 40	0 58 17.1	0 58 06.3	0 57 55.6	0 57 44.8	0 57 34.1	0 57 23.3	0.40	1.08
22 00	0 58 25.3	0 58 14.5	0 58 03.7	0 57 52.9	0 57 42.1	0 57 31.3	+0.41	-1.08
22 20	0 58 33.6	0 58 22.8	0 58 12.0	0 58 01.1	0 57 50.3	0 57 39.5	0.42	1.08
22 40	0 58 42.1	0 58 31.2	0 58 20.4	0 58 09.5	0 57 58.7	0 57 47.9	0.43	1.08
23 00	0 58 50.7	0 58 39.8	0 58 29.0	0 58 18.1	0 58 07.2	0 57 56.4	0.43	1.09
23 20	0 58 59.5	0 58 48.6	0 58 37.7	0 58 26.8	0 58 15.9	0 58 05.0	0.44	1.09
23 40	0 59 08.5	0 58 57.5	0 58 46.6	0 58 35.7	0 58 24.8	0 58 13.9	0.45	1.09
24 00	0 59 17.6	0 59 06.7	0 58 55.7	0 58 44.8	0 58 33.8	0 58 22.9	+0.46	-1.09
24 20	0 59 26.9	0 59 15.9	0 59 04.9	0 58 54.0	0 58 43.0	0 58 32.0	0.47	1.10
24 40	0 59 36.4	0 59 25.4	0 59 14.4	0 59 03.4	0 58 52.4	0 58 41.3	0.47	1.10
25 00	0 59 46.0	0 59 35.0	0 59 23.9	0 59 12.9	0 59 01.9	0 58 50.8	0.48	1.10
25 20	0 59 55.8	0 59 44.8	0 59 33.7	0 59 22.6	0 59 11.6	0 59 00.5	0.49	1.11
25 40	1 00 05.8	0 59 54.7	0 59 43.6	0 59 32.5	0 59 21.4	0 59 10.3	0.50	1.11
26 00	1 00 16.0	1 00 04.9	0 59 53.7	0 59 42.6	0 59 31.5	0 59 20.4	+0.51	-1.11
26 20	1 00 26.3	1 00 15.2	1 00 04.0	0 59 52.9	0 59 41.7	0 59 30.6	0.52	1.12
26 40	1 00 36.9	1 00 25.7	1 00 14.5	1 00 03.3	0 59 52.1	0 59 40.9	0.53	1.12
27 00	1 00 47.6	1 00 36.4	1 00 25.2	1 00 13.9	1 00 02.7	0 59 51.5	0.54	1.12
27 20	1 00 58.5	1 00 47.3	1 00 36.0	1 00 24.7	1 00 13.5	1 00 02.2	0.55	1.13
27 40	1 01 09.6	1 00 58.3	1 00 47.0	1 00 35.7	1 00 24.4	1 00 13.1	0.56	1.13
28 00	1 01 20.9	1 01 09.6	1 00 58.2	1 00 46.9	1 00 35.6	1 00 24.3	+0.57	-1.13
28 20	1 01 32.4	1 01 21.0	1 01 09.7	1 00 58.3	1 00 46.9	1 00 35.6	0.58	1.14
28 40	1 01 44.1	1 01 32.7	1 01 21.3	1 01 09.9	1 00 58.5	1 00 47.1	0.59	1.14
29 00	1 01 55.9	1 01 44.5	1 01 33.1	1 01 21.6	1 01 10.2	1 00 58.8	0.60	1.14
29 20	1 02 08.0	1 01 56.6	1 01 45.1	1 01 33.6	1 01 22.2	1 01 10.7	0.61	1.15
29 40	1 02 20.3	1 02 08.8	1 01 57.3	1 01 45.8	1 01 34.3	1 01 22.8	0.62	1.15
30 00	1 02 32.8	1 02 21.3	1 02 09.7	1 01 58.2	1 01 46.6	1 01 35.1	+0.63	-1.15

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AZIMUTH AT ELONGATION

Decl. Lat.							Variations for—	
	89°05'50"	89°06'00"	89°06'10"	89°06'20"	89°06'30"	89°06'40"	1' of Lat.	1" of s
30 00	1 02 32.8	1 02 21.3	1 02 09.7	1 01 58.2	1 01 46.6	1 01 35.1	+0.63	-1.15
30 10	1 02 39.2	1 02 27.6	1 02 16.0	1 02 04.5	1 01 52.9	1 01 41.3	0.63	1.16
30 20	1 02 45.5	1 02 34.0	1 02 22.4	1 02 10.8	1 01 59.2	1 01 47.6	0.64	1.16
30 30	1 02 52.0	1 02 40.4	1 02 28.8	1 02 17.2	1 02 05.6	1 01 53.9	0.64	1.16
30 40	1 02 58.5	1 02 46.8	1 02 35.2	1 02 23.6	1 02 12.0	1 02 00.3	0.65	1.16
30 50	1 03 05.0	1 02 53.4	1 02 41.7	1 02 30.1	1 02 18.4	1 02 06.8	0.65	1.16
31 00	1 03 11.6	1 02 59.9	1 02 48.3	1 02 36.6	1 02 24.9	1 02 13.3	+0.66	-1.17
31 10	1 03 18.3	1 03 06.6	1 02 54.9	1 02 43.2	1 02 31.5	1 02 19.8	0.66	1.17
31 20	1 03 25.0	1 03 13.3	1 03 01.6	1 02 49.9	1 02 38.2	1 02 26.4	0.67	1.17
31 30	1 03 31.7	1 03 20.0	1 03 08.3	1 02 56.6	1 02 44.8	1 02 33.1	0.68	1.17
31 40	1 03 38.6	1 03 26.8	1 03 15.1	1 03 03.3	1 02 51.6	1 02 39.8	0.68	1.17
31 50	1 03 45.5	1 03 33.7	1 03 21.9	1 03 10.1	1 02 58.4	1 02 46.6	0.69	1.18
32 00	1 03 52.4	1 03 40.6	1 03 28.8	1 03 17.0	1 03 05.2	1 02 53.4	+0.69	-1.18
32 10	1 03 59.4	1 03 47.6	1 03 35.8	1 03 23.9	1 03 12.1	1 03 00.3	0.70	1.18
32 20	1 04 06.4	1 03 54.6	1 03 42.8	1 03 30.9	1 03 19.1	1 03 07.3	0.70	1.18
32 30	1 04 13.6	1 04 01.7	1 03 49.8	1 03 38.0	1 03 26.1	1 03 14.3	0.71	1.19
32 40	1 04 20.7	1 04 08.8	1 03 57.0	1 03 45.1	1 03 33.2	1 03 21.3	0.72	1.19
32 50	1 04 28.0	1 04 16.1	1 04 04.2	1 03 52.3	1 03 40.4	1 03 28.4	0.72	1.19
33 00	1 04 35.2	1 04 23.3	1 04 11.4	1 03 59.5	1 03 47.6	1 03 35.6	+0.73	-1.19
33 10	1 04 42.6	1 04 30.7	1 04 18.7	1 04 06.8	1 03 54.8	1 03 42.9	0.73	1.19
33 20	1 04 50.0	1 04 38.0	1 04 26.1	1 04 14.1	1 04 02.1	1 03 50.2	0.74	1.20
33 30	1 04 57.5	1 04 45.5	1 04 33.5	1 04 21.5	1 04 09.5	1 03 57.5	0.75	1.20
33 40	1 05 05.0	1 04 53.0	1 04 41.0	1 04 29.0	1 04 17.0	1 04 04.9	0.75	1.20
33 50	1 05 12.6	1 05 00.6	1 04 48.5	1 04 36.5	1 04 24.5	1 04 12.4	0.76	1.20
34 00	1 05 20.3	1 05 08.2	1 04 56.2	1 04 44.1	1 04 32.0	1 04 20.0	+0.76	-1.21
34 10	1 05 28.0	1 05 15.9	1 05 03.8	1 04 51.7	1 04 39.7	1 04 27.6	0.77	1.21
34 20	1 05 35.8	1 05 23.7	1 05 11.6	1 04 59.5	1 04 47.4	1 04 35.2	0.78	1.21
34 30	1 05 43.6	1 05 31.5	1 05 19.4	1 05 07.2	1 04 55.1	1 04 43.0	0.78	1.21
34 40	1 05 51.6	1 05 39.4	1 05 27.2	1 05 15.1	1 05 02.9	1 04 50.8	0.79	1.22
34 50	1 05 59.5	1 05 47.4	1 05 35.2	1 05 23.0	1 05 10.8	1 04 58.6	0.80	1.22
35 00	1 06 07.6	1 05 55.4	1 05 43.2	1 05 31.0	1 05 18.8	1 05 06.6	+0.80	-1.22
35 10	1 06 15.7	1 06 03.5	1 05 51.2	1 05 39.0	1 05 26.8	1 05 14.5	0.81	1.22
35 20	1 06 23.9	1 06 11.6	1 05 59.4	1 05 47.1	1 05 34.9	1 05 22.6	0.82	1.23
35 30	1 06 32.1	1 06 19.9	1 06 07.6	1 05 55.3	1 05 43.0	1 05 30.7	0.82	1.23
35 40	1 06 40.5	1 06 28.2	1 06 15.8	1 06 03.5	1 05 51.2	1 05 38.9	0.83	1.23
35 50	1 06 48.9	1 06 36.5	1 06 24.2	1 06 11.8	1 05 59.5	1 05 47.2	0.84	1.23
36 00	1 06 57.3	1 06 44.9	1 06 32.6	1 06 20.2	1 06 07.9	1 05 55.5	+0.84	-1.24
36 10	1 07 05.8	1 06 53.4	1 06 41.1	1 06 28.7	1 06 16.3	1 06 03.9	0.85	1.24
36 20	1 07 14.4	1 07 02.0	1 06 49.6	1 06 37.2	1 06 24.8	1 06 12.4	0.86	1.24
36 30	1 07 23.1	1 07 10.7	1 06 58.2	1 06 45.8	1 06 33.3	1 06 20.9	0.86	1.24
36 40	1 07 31.8	1 07 19.4	1 07 06.9	1 06 54.4	1 06 42.0	1 06 29.5	0.87	1.25
36 50	1 07 40.7	1 07 28.2	1 07 15.7	1 07 03.2	1 06 50.7	1 06 38.2	0.88	1.25
37 00	1 07 49.5	1 07 37.0	1 07 24.5	1 07 12.0	1 06 59.4	1 06 46.9	+0.89	-1.25
37 10	1 07 58.5	1 07 45.9	1 07 33.4	1 07 20.8	1 07 08.3	1 06 55.7	0.89	1.25
37 20	1 08 07.5	1 07 55.0	1 07 42.4	1 07 29.8	1 07 17.2	1 07 04.6	0.90	1.26
37 30	1 08 16.6	1 08 04.0	1 07 51.4	1 07 38.8	1 07 26.2	1 07 13.6	0.91	1.26
37 40	1 08 25.8	1 08 13.2	1 08 00.6	1 07 47.9	1 07 35.3	1 07 22.6	0.92	1.26
37 50	1 08 35.1	1 08 22.4	1 08 09.8	1 07 57.1	1 07 44.4	1 07 31.8	0.92	1.27
38 00	1 08 44.4	1 08 31.7	1 08 19.0	1 08 06.3	1 07 53.6	1 07 41.0	+0.93	-1.27
38 10	1 08 53.8	1 08 41.1	1 08 28.4	1 08 15.7	1 08 02.9	1 07 50.2	0.94	1.27
38 20	1 09 03.3	1 08 50.6	1 08 37.8	1 08 25.1	1 08 12.3	1 07 59.6	0.95	1.27
38 30	1 09 12.9	1 09 00.1	1 08 47.3	1 08 34.6	1 08 21.8	1 08 09.0	0.96	1.28
38 40	1 09 22.5	1 09 09.7	1 08 56.9	1 08 44.1	1 08 31.3	1 08 18.5	0.96	1.28
38 50	1 09 32.3	1 09 19.4	1 09 06.6	1 08 53.8	1 08 40.9	1 08 28.1	0.97	1.28
39 00	1 09 42.1	1 09 29.2	1 09 16.3	1 09 03.5	1 08 50.6	1 08 37.7	+0.98	-1.29
39 10	1 09 52.0	1 09 39.1	1 09 26.2	1 09 13.3	1 09 00.4	1 08 47.5	0.99	1.29
39 20	1 10 02.0	1 09 49.0	1 09 36.1	1 09 23.2	1 09 10.2	1 08 57.3	1.00	1.29
39 30	1 10 12.0	1 09 59.1	1 09 46.1	1 09 33.1	1 09 20.2	1 09 07.2	1.00	1.30
39 40	1 10 22.2	1 10 09.2	1 09 56.2	1 09 43.2	1 09 30.2	1 09 17.2	1.01	1.30
39 50	1 10 32.4	1 10 19.4	1 10 06.3	1 09 53.3	1 09 40.3	1 09 27.3	1.02	1.30
40 00	1 10 42.7	1 10 29.6	1 10 16.6	1 10 03.5	1 09 50.5	1 09 37.4	+1.03	-1.31

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AZIMUTH AT ELONGATION

Decl. Lat.	89°05'50"			89°06'00"			89°06'10"			89°06'20"			89°06'30"			89°06'40"			Variations for—	
	1' of Lat.			1' of Lat.			1' of Lat.			1' of Lat.			1' of Lat.			1' of Lat.			1' of Lat.	1' of s
40 00	1	10	42.7	1	10	29.6	1	10	16.6	1	10	03.5	1	09	50.5	1	09	37.4	+1.03	-1.31
40 10	1	10	53.1	1	10	40.0	1	10	26.9	1	10	13.8	1	10	00.7	1	09	47.7	1.04	1.31
40 20	1	11	03.6	1	10	50.5	1	10	37.3	1	10	24.2	1	10	11.1	1	09	58.0	1.05	1.31
40 30	1	11	14.2	1	11	01.0	1	10	47.9	1	10	34.7	1	10	21.6	1	10	08.4	1.06	1.32
40 40	1	11	24.8	1	11	11.6	1	10	58.5	1	10	45.3	1	10	32.1	1	10	18.9	1.06	1.32
40 50	1	11	35.6	1	11	22.4	1	11	09.1	1	10	55.9	1	10	42.7	1	10	29.5	1.07	1.32
41 00	1	11	46.4	1	11	33.2	1	11	19.9	1	11	06.7	1	10	53.4	1	10	40.2	+1.08	-1.33
41 10	1	11	57.4	1	11	44.1	1	11	30.8	1	11	17.5	1	11	04.2	1	10	50.9	1.09	1.33
41 20	1	12	08.4	1	11	55.1	1	11	41.8	1	11	28.4	1	11	15.1	1	11	01.8	1.10	1.33
41 30	1	12	19.5	1	12	06.2	1	11	52.8	1	11	39.5	1	11	26.1	1	11	12.8	1.11	1.34
41 40	1	12	30.7	1	12	17.3	1	12	04.0	1	11	50.6	1	11	37.2	1	11	23.8	1.12	1.34
41 50	1	12	42.0	1	12	28.6	1	12	15.2	1	12	01.8	1	11	48.4	1	11	34.9	1.13	1.34
42 00	1	12	53.5	1	12	40.0	1	12	26.5	1	12	13.1	1	11	59.6	1	11	46.2	+1.14	-1.35
42 10	1	13	05.0	1	12	51.5	1	12	38.0	1	12	24.5	1	12	11.0	1	11	57.5	1.15	1.35
42 20	1	13	16.6	1	13	03.0	1	12	49.5	1	12	36.0	1	12	22.4	1	12	08.9	1.16	1.35
42 30	1	13	28.3	1	13	14.7	1	13	01.1	1	12	47.6	1	12	34.0	1	12	20.4	1.17	1.36
42 40	1	13	40.1	1	13	26.5	1	13	12.9	1	12	59.3	1	12	45.7	1	12	32.1	1.18	1.36
42 50	1	13	52.0	1	13	38.3	1	13	24.7	1	13	11.1	1	12	57.4	1	12	43.8	1.19	1.36
43 00	1	14	04.0	1	13	50.3	1	13	36.6	1	13	23.0	1	13	09.3	1	12	55.6	+1.20	-1.37
43 10	1	14	16.1	1	14	02.4	1	13	48.7	1	13	34.9	1	13	21.2	1	13	07.5	1.21	1.37
43 20	1	14	28.3	1	14	14.5	1	14	00.8	1	13	47.0	1	13	33.3	1	13	19.5	1.22	1.37
43 30	1	14	40.6	1	14	26.8	1	14	13.0	1	13	59.2	1	13	45.5	1	13	31.7	1.23	1.38
43 40	1	14	53.0	1	14	39.2	1	14	25.4	1	14	11.6	1	13	57.7	1	13	43.9	1.24	1.38
43 50	1	15	05.6	1	14	51.7	1	14	37.8	1	14	24.0	1	14	10.1	1	13	56.2	1.25	1.39
44 00	1	15	18.2	1	15	04.3	1	14	50.4	1	14	36.5	1	14	22.6	1	14	08.7	+1.26	-1.39
44 10	1	15	31.0	1	15	17.0	1	15	03.1	1	14	49.1	1	14	35.2	1	14	21.2	1.27	1.39
44 20	1	15	43.8	1	15	29.8	1	15	15.9	1	15	01.9	1	14	47.9	1	14	33.9	1.28	1.40
44 30	1	15	56.8	1	15	42.8	1	15	28.7	1	15	14.7	1	15	00.7	1	14	46.7	1.29	1.40
44 40	1	16	09.9	1	15	55.8	1	15	41.7	1	15	27.7	1	15	13.6	1	14	59.6	1.31	1.41
44 50	1	16	23.1	1	16	09.0	1	15	54.9	1	15	40.8	1	15	26.7	1	15	12.6	1.32	1.41
45 00	1	16	36.4	1	16	22.2	1	16	08.1	1	15	54.0	1	15	39.8	1	15	25.7	+1.33	-1.41
45 10	1	16	49.8	1	16	35.6	1	16	21.4	1	16	07.3	1	15	53.1	1	15	38.9	1.34	1.42
45 20	1	17	03.4	1	16	49.1	1	16	34.9	1	16	20.7	1	16	06.5	1	15	52.2	1.35	1.42
45 30	1	17	17.0	1	17	02.8	1	16	48.5	1	16	34.2	1	16	20.0	1	16	05.7	1.36	1.43
45 40	1	17	30.8	1	17	16.5	1	17	02.2	1	16	47.9	1	16	33.6	1	16	19.3	1.38	1.43
45 50	1	17	44.7	1	17	30.4	1	17	16.0	1	17	01.7	1	16	47.3	1	16	33.0	1.39	1.44
46 00	1	17	58.8	1	17	44.4	1	17	30.0	1	17	15.6	1	17	01.2	1	16	46.8	+1.40	-1.44
46 10	1	18	12.9	1	17	58.5	1	17	44.0	1	17	29.6	1	17	15.2	1	17	00.7	1.41	1.44
46 20	1	18	27.2	1	18	12.7	1	17	58.2	1	17	43.8	1	17	29.3	1	17	14.8	1.43	1.45
46 30	1	18	41.6	1	18	27.1	1	18	12.6	1	17	58.0	1	17	43.5	1	17	29.0	1.44	1.45
46 40	1	18	56.2	1	18	41.6	1	18	27.0	1	18	12.4	1	17	57.9	1	17	43.3	1.45	1.46
46 50	1	19	10.8	1	18	56.2	1	18	41.6	1	18	27.0	1	18	12.4	1	17	57.7	1.46	1.46
47 00	1	19	25.6	1	19	11.0	1	18	56.3	1	18	41.6	1	18	27.0	1	18	12.3	+1.48	-1.47
47 10	1	19	40.6	1	19	25.9	1	19	11.1	1	18	56.4	1	18	41.7	1	18	27.0	1.49	1.47
47 20	1	19	55.6	1	19	40.9	1	19	26.1	1	19	11.4	1	18	56.6	1	18	41.9	1.50	1.48
47 30	1	20	10.8	1	19	56.0	1	19	41.2	1	19	26.4	1	19	11.6	1	18	56.8	1.52	1.48
47 40	1	20	26.2	1	20	11.3	1	19	56.5	1	19	41.6	1	19	26.8	1	19	11.9	1.53	1.49
47 50	1	20	41.7	1	20	26.8	1	20	11.9	1	19	57.0	1	19	42.1	1	19	27.2	1.55	1.49
48 00	1	20	57.3	1	20	42.4	1	20	27.4	1	20	12.5	1	19	57.5	1	19	42.6	+1.56	-1.49
48 10	1	21	13.1	1	20	58.1	1	20	43.1	1	20	28.1	1	19	58.1	1	19	58.1	1.57	1.50
48 20	1	21	29.0	1	21	13.9	1	20	58.9	1	20	43.8	1	20	28.8	1	20	13.8	1.59	1.50
48 30	1	21	45.0	1	21	29.9	1	21	14.8	1	20	59.7	1	20	44.7	1	20	29.6	1.60	1.51
48 40	1	22	01.2	1	21	46.1	1	21	30.9	1	21	15.8	1	21	00.7	1	20	45.5	1.62	1.51
48 50	1	22	17.6	1	22	02.4	1	21	47.2	1	21	32.0	1	21	16.8	1	21	01.6	1.63	1.52
49 00	1	22	34.1	1	22	18.8	1	22	03.6	1	21	48.4	1	21	33.1	1	21	17.9	+1.65	-1.52
49 10	1	22	50.8	1	22	35.5	1	22	20.2	1	22	04.9	1	21	49.6	1	21	34.3	1.66	1.53
49 20	1	23	07.6	1	22	52.2	1	22	36.9	1	22	21.5	1	22	06.2	1	21	50.8	1.68	1.53
49 30	1	23	24.5	1	23	09.1	1	22	53.7	1	22	38.3	1	22	22.9	1	22	07.5	1.69	1.54
49 40	1	23	41.7	1	23	26.2	1	23	10.8	1	22	55.3	1	22	39.8	1	22	24.4	1.71	1.55
49 50	1	23	58.9	1	23	43.4	1	23	27.9	1	23	12.4	1	22	56.9	1	22	41.4	1.73	1.55
50 00	1	24	16.4	1	24	00.8	1	23	45.3	1	23	29.7	1	23	14.2	1	22	58.6	+1.74	-1.56

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Decl. Lat.	89°05'50"			89°06'00"			89°06'10"			89°06'20"			89°06'30"			89°06'40"			Variations for—	
	° ' "			° ' "			° ' "			° ' "			° ' "			° ' "			1' of Lat.	1' of δ
50 00	1	24	16.4	1	24	00.8	1	23	45.3	1	23	29.7	1	23	14.2	1	22	58.6	+1.74	-1.56
50 10	1	24	34.0	1	24	18.4	1	24	02.8	1	23	47.2	1	23	31.6	1	23	15.9	1.76	1.56
50 20	1	24	51.8	1	24	36.1	1	24	20.5	1	24	04.8	1	23	49.1	1	23	33.5	1.78	1.57
50 30	1	25	09.7	1	24	54.0	1	24	38.3	1	24	22.6	1	24	06.8	1	23	51.1	1.79	1.57
50 40	1	25	27.9	1	25	12.1	1	24	56.3	1	24	40.5	1	24	24.7	1	24	09.0	1.81	1.58
50 50	1	25	46.2	1	25	30.3	1	25	14.5	1	24	58.7	1	24	42.8	1	24	27.0	1.83	1.58
51 00	1	26	04.6	1	25	48.7	1	25	32.8	1	25	16.9	1	25	01.1	1	24	45.2	+1.84	-1.59
51 10	1	26	23.3	1	26	07.3	1	25	51.4	1	25	35.4	1	25	19.5	1	25	03.5	1.86	1.60
51 20	1	26	42.1	1	26	26.1	1	26	10.1	1	25	54.1	1	25	38.1	1	25	22.1	1.88	1.60
51 30	1	27	01.1	1	26	45.0	1	26	29.0	1	26	12.9	1	25	56.8	1	25	40.8	1.90	1.61
51 40	1	27	20.3	1	27	04.2	1	26	48.0	1	26	31.9	1	26	15.8	1	25	59.7	1.92	1.61
51 50	1	27	39.7	1	27	23.5	1	27	07.3	1	26	51.1	1	26	34.9	1	26	18.7	1.94	1.62
52 00	1	27	59.2	1	27	43.0	1	27	26.7	1	27	10.5	1	26	54.2	1	26	38.0	+1.95	-1.62
52 10	1	28	19.0	1	28	02.7	1	27	46.4	1	27	30.1	1	27	13.8	1	26	57.5	1.97	1.63
52 20	1	28	38.9	1	28	22.6	1	28	06.2	1	27	49.8	1	27	33.5	1	27	17.1	1.99	1.64
52 30	1	28	59.1	1	28	42.7	1	28	26.2	1	28	09.8	1	27	53.4	1	27	36.9	2.01	1.64
52 40	1	29	19.4	1	29	02.9	1	28	46.4	1	28	30.0	1	28	13.5	1	27	57.0	2.03	1.65
52 50	1	29	40.0	1	29	23.4	1	29	06.9	1	28	50.3	1	28	33.8	1	28	17.2	2.05	1.66
53 00	1	30	00.7	1	29	44.1	1	29	27.5	1	29	10.9	1	28	54.2	1	28	37.6	+2.07	-1.66
53 10	1	30	21.7	1	30	05.0	1	29	48.3	1	29	31.6	1	29	14.9	1	28	58.3	2.09	1.67
53 20	1	30	42.8	1	30	26.1	1	30	09.3	1	29	52.6	1	29	35.8	1	29	19.1	2.11	1.67
53 30	1	31	04.2	1	30	47.4	1	30	30.6	1	30	13.8	1	29	57.0	1	29	40.1	2.14	1.68
53 40	1	31	25.8	1	31	08.9	1	30	52.1	1	30	35.2	1	30	18.3	1	30	01.4	2.16	1.69
53 50	1	31	47.6	1	31	30.7	1	31	13.7	1	30	56.8	1	30	39.8	1	30	22.9	2.18	1.69
54 00	1	32	09.7	1	31	52.6	1	31	35.6	1	31	18.6	1	31	01.6	1	30	44.6	+2.20	-1.70
54 10	1	32	31.9	1	32	14.8	1	31	57.8	1	31	40.7	1	31	23.6	1	31	06.5	2.22	1.71
54 20	1	32	54.4	1	32	37.3	1	32	20.1	1	32	02.9	1	31	45.8	1	31	28.6	2.25	1.72
54 30	1	33	17.1	1	32	59.9	1	32	42.7	1	32	25.4	1	32	08.2	1	31	51.0	2.27	1.72
54 40	1	33	40.1	1	33	22.8	1	33	05.5	1	32	48.2	1	32	30.9	1	32	13.6	2.29	1.73
54 50	1	34	03.3	1	33	45.9	1	33	28.5	1	33	11.2	1	32	53.8	1	32	36.4	2.32	1.74
55 00	1	34	26.7	1	34	09.2	1	33	51.8	1	33	34.4	1	33	16.9	1	32	59.5	+2.34	-1.74
55 10	1	34	50.4	1	34	32.8	1	34	15.3	1	33	57.8	1	33	40.3	1	33	22.8	2.36	1.75
55 20	1	35	14.3	1	34	56.7	1	34	39.1	1	34	21.5	1	34	03.9	1	33	46.3	2.39	1.76
55 30	1	35	38.4	1	35	20.8	1	35	03.1	1	34	45.5	1	34	27.8	1	34	10.1	2.41	1.77
55 40	1	36	02.9	1	35	45.1	1	35	27.4	1	35	09.7	1	34	51.9	1	34	34.2	2.44	1.77
55 50	1	36	27.5	1	36	09.7	1	35	51.9	1	35	34.1	1	35	16.3	1	34	58.5	2.47	1.78
56 00	1	36	52.5	1	36	34.6	1	36	16.7	1	35	58.8	1	35	40.9	1	35	23.0	+2.49	-1.79
56 10	1	37	17.7	1	36	59.7	1	36	41.8	1	36	23.8	1	36	05.8	1	35	47.9	2.52	1.80
56 20	1	37	43.2	1	37	25.1	1	37	07.1	1	36	49.0	1	36	31.0	1	36	12.9	2.55	1.80
56 30	1	38	08.9	1	37	50.8	1	37	32.7	1	37	14.5	1	36	56.4	1	36	38.3	2.57	1.81
56 40	1	38	34.9	1	38	16.7	1	37	58.5	1	37	40.3	1	37	22.1	1	37	03.9	2.60	1.82
56 50	1	39	01.2	1	38	43.0	1	38	24.7	1	38	06.4	1	37	48.1	1	37	29.8	2.63	1.83
57 00	1	39	27.8	1	39	09.5	1	38	51.1	1	38	32.7	1	38	14.4	1	37	56.0	+2.66	-1.84
57 10	1	39	54.7	1	39	36.3	1	39	17.8	1	38	59.4	1	38	40.9	1	38	22.5	2.69	1.84
57 20	1	40	21.9	1	40	03.4	1	39	44.8	1	39	26.3	1	39	07.8	1	38	49.2	2.72	1.85
57 30	1	40	49.4	1	40	30.8	1	40	12.1	1	39	53.5	1	39	34.9	1	39	16.3	2.75	1.86
57 40	1	41	17.2	1	40	58.5	1	40	39.8	1	40	21.1	1	40	02.4	1	39	43.7	2.78	1.87
57 50	1	41	45.3	1	41	26.5	1	41	07.7	1	40	48.9	1	40	30.1	1	40	11.3	2.81	1.88
58 00	1	42	13.7	1	41	54.8	1	41	35.9	1	41	17.0	1	40	58.2	1	40	39.3	+2.84	-1.89
58 10	1	42	42.4	1	42	23.4	1	42	04.5	1	41	45.5	1	41	26.5	1	41	07.6	2.87	1.90
58 20	1	43	11.4	1	42	52.4	1	42	33.3	1	42	14.3	1	41	55.2	1	41	36.2	2.90	1.91
58 30	1	43	40.8	1	43	21.7	1	43	02.5	1	42	43.4	1	42	24.2	1	42	05.1	2.94	1.91
58 40	1	44	10.5	1	43	51.3	1	43	32.0	1	43	12.8	1	42	53.6	1	42	34.3	2.97	1.92
58 50	1	44	40.5	1	44	21.2	1	44	01.9	1	43	42.6	1	43	23.2	1	43	03.9	3.00	1.93
59 00	1	45	10.9	1	44	51.5	1	44	32.1	1	44	12.7	1	43	53.2	1	43	33.8	+3.04	-1.94
59 10	1	45	41.7	1	45	22.2	1	45	02.6	1	44	43.1	1	44	23.6	1	44	04.1	3.07	1.95
59 20	1	46	12.8	1	45	53.2	1	45	33.5	1	45	13.9	1	44	54.3	1	44	34.7	3.11	1.96
59 30	1	46	44.2	1	46	24.5	1	46	04.8	1	45	45.1	1	45	25.4	1	45	05.7	3.14	1.97
59 40	1	47	16.0	1	46	56.2	1	46	36.4	1	46	16.6	1	45	56.8	1	45	37.0	3.18	1.98
59 50	1	47	48.2	1	47	28.3	1	47	08.4	1	46	48.5	1	46	28.6	1	46	08.7	3.22	1.99
60 00	1	48	20.8	1	48	00.8	1	47	40.8	1	47	20.8	1	47	00.8	1	46	40.8	+3.26	-2.00

POLARIS, 1965

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AZIMUTH AT ELONGATION

Decl. Lat.	89°05'50"			89°06'00"			89°06'10"			89°06'20"			89°06'30"			89°06'40"			Variations for—	
	1' of Lat.			1' of Lat.			1' of Lat.			1' of Lat.			1' of Lat.			1' of Lat.			1' of Lat.	1' of s
60 00	1 48	20.8		1 48	00.8		1 47	40.8		1 47	20.8		1 47	00.8		1 46	40.8		+3.26	-2.00
60 10	1 48	53.8		1 48	33.7		1 48	13.5		1 47	53.4		1 47	33.3		1 47	13.2		3.29	2.01
60 20	1 49	27.1		1 49	06.9		1 48	46.7		1 48	26.5		1 48	06.3		1 47	46.1		3.33	2.02
60 30	1 50	00.9		1 49	40.5		1 49	20.2		1 48	59.9		1 48	39.6		1 48	19.3		3.37	2.03
60 40	1 50	35.0		1 50	14.6		1 49	54.2		1 49	33.8		1 49	13.3		1 48	52.9		3.41	2.04
60 50	1 51	09.6		1 50	49.1		1 50	28.5		1 50	08.0		1 49	47.5		1 49	26.9		3.46	2.05
61 00	1 51	44.6		1 51	23.9		1 51	03.3		1 50	42.7		1 50	22.0		1 50	01.4		+3.50	-2.06
61 10	1 52	20.0		1 51	59.2		1 51	38.5		1 51	17.7		1 50	57.0		1 50	36.3		3.54	2.07
61 20	1 52	55.8		1 52	35.0		1 52	14.1		1 51	53.3		1 51	32.4		1 51	11.5		3.58	2.09
61 30	1 53	32.1		1 53	11.1		1 52	50.2		1 52	29.2		1 52	08.2		1 51	47.3		3.63	2.10
61 40	1 54	08.8		1 53	47.8		1 53	26.7		1 53	05.6		1 52	44.5		1 52	23.4		3.67	2.11
61 50	1 54	46.0		1 54	24.8		1 54	03.6		1 53	42.5		1 53	21.3		1 53	00.1		3.72	2.12
62 00	1 55	23.7		1 55	02.4		1 54	41.1		1 54	19.8		1 53	58.5		1 53	37.1		+3.77	-2.13
62 10	1 56	01.8		1 55	40.4		1 55	19.0		1 54	57.5		1 54	36.1		1 54	14.7		3.81	2.14
62 20	1 56	40.4		1 56	18.9		1 55	57.3		1 55	35.8		1 55	14.2		1 54	52.7		3.86	2.15
62 30	1 57	19.5		1 56	57.9		1 56	36.2		1 56	14.5		1 55	52.9		1 55	31.2		3.91	2.17
62 40	1 57	59.1		1 57	37.4		1 57	15.6		1 56	53.8		1 56	32.0		1 56	10.2		3.96	2.18
62 50	1 58	39.3		1 58	17.3		1 57	55.4		1 57	33.5		1 57	11.6		1 56	49.7		4.01	2.19
63 00	1 59	19.9		1 58	57.8		1 58	35.8		1 58	13.8		1 57	51.7		1 57	29.7		+4.06	-2.20
63 10	2 00	01.0		1 59	38.9		1 59	16.7		1 58	54.5		1 58	32.4		1 58	10.2		4.12	2.22
63 20	2 00	42.7		2 00	20.4		1 59	58.2		1 59	35.9		1 59	13.6		1 58	51.3		4.17	2.23
63 30	2 01	25.0		2 01	02.6		2 00	40.1		2 00	17.7		1 59	55.3		1 59	32.9		4.23	2.24
63 40	2 02	07.8		2 01	45.2		2 01	22.7		2 01	00.1		2 00	37.6		2 00	15.0		4.28	2.26
63 50	2 02	51.1		2 02	28.5		2 02	05.8		2 01	43.1		2 01	20.4		2 00	57.7		4.34	2.27
64 00	2 03	35.1		2 03	12.3		2 02	49.5		2 02	26.6		2 02	03.8		2 01	41.0		+4.40	-2.28
64 10	2 04	19.6		2 03	56.7		2 03	33.7		2 03	10.8		2 02	47.8		2 02	24.8		4.46	2.30
64 20	2 05	04.8		2 04	41.7		2 04	18.6		2 03	55.5		2 03	32.4		2 03	09.3		4.52	2.31
64 30	2 05	50.5		2 05	27.3		2 05	04.1		2 04	40.8		2 04	17.6		2 03	54.3		4.58	2.32
64 40	2 06	36.9		2 06	13.5		2 05	50.2		2 05	26.8		2 05	03.4		2 04	40.0		4.64	2.34
64 50	2 07	23.9		2 07	00.4		2 06	36.9		2 06	13.4		2 05	49.8		2 05	26.3		4.71	2.35
65 00	2 08	11.6		2 07	47.9		2 07	24.3		2 07	00.6		2 06	36.9		2 06	13.2		+4.77	-2.37
65 10	2 09	00.0		2 08	36.1		2 08	12.3		2 07	48.5		2 07	24.7		2 07	00.8		4.84	2.38
65 20	2 09	49.0		2 09	25.0		2 09	01.0		2 08	37.0		2 08	13.1		2 07	49.1		4.91	2.40
65 30	2 10	38.7		2 10	14.6		2 09	50.4		2 09	26.3		2 09	02.2		2 08	38.0		4.98	2.41
65 40	2 11	29.1		2 11	04.8		2 10	40.5		2 10	16.2		2 09	52.0		2 09	27.7		5.05	2.43
65 50	2 12	20.2		2 11	55.8		2 11	31.3		2 11	06.9		2 10	42.5		2 10	18.0		5.12	2.44
66 00	2 13	12.1		2 12	47.5		2 12	22.9		2 11	58.3		2 11	33.7		2 11	09.1		+5.19	-2.46
66 10	2 14	04.7		2 13	40.0		2 13	15.2		2 12	50.4		2 12	25.7		2 12	00.9		5.27	2.48
66 20	2 14	58.1		2 14	33.2		2 14	08.2		2 13	43.3		2 13	18.4		2 12	53.5		5.34	2.49
66 30	2 15	52.3		2 15	27.2		2 15	02.1		2 14	37.0		2 14	11.9		2 13	46.8		5.42	2.51
66 40	2 16	47.2		2 16	22.0		2 15	56.7		2 15	31.5		2 15	06.2		2 14	40.9		5.50	2.53
66 50	2 17	43.0		2 17	17.6		2 16	52.2		2 16	26.7		2 16	01.3		2 15	35.9		5.59	2.54
67 00	2 18	39.7		2 18	14.0		2 17	48.4		2 17	22.8		2 16	57.2		2 16	31.6		+5.67	-2.56
67 10	2 19	37.1		2 19	11.3		2 18	45.6		2 18	19.8		2 17	54.0		2 17	28.2		5.76	2.58
67 20	2 20	35.5		2 20	09.5		2 19	43.5		2 19	17.6		2 18	51.6		2 18	25.6		5.84	2.60
67 30	2 21	34.7		2 21	08.6		2 20	42.4		2 20	16.3		2 19	50.1		2 19	24.0		5.93	2.61
67 40	2 22	34.9		2 22	08.5		2 21	42.2		2 21	15.9		2 20	49.5		2 20	23.2		6.02	2.63
67 50	2 23	35.9		2 23	09.4		2 22	42.9		2 22	16.4		2 21	49.8		2 21	23.3		6.12	2.65
68 00	2 24	38.0		2 24	11.3		2 23	44.5		2 23	17.8		2 22	51.1		2 22	24.4		+6.21	-2.67
68 10	2 25	41.0		2 25	14.1		2 24	47.2		2 24	20.2		2 23	53.3		2 23	26.4		6.31	2.69
68 20	2 26	45.0		2 26	17.9		2 25	50.8		2 25	23.7		2 24	56.6		2 24	29.4		6.41	2.71
68 30	2 27	50.0		2 27	22.7		2 26	55.4		2 26	28.1		2 25	00.8		2 25	33.5		6.51	2.73
68 40	2 28	56.1		2 28	28.6		2 28	01.1		2 27	33.5		2 27	06.0		2 26	38.5		6.62	2.75
68 50	2 30	03.2		2 29	35.5		2 29	07.8		2 28	40.1		2 28	12.3		2 27	44.6		6.73	2.77
69 00	2 31	11.4		2 30	43.5		2 30	15.6		2 29	47.7		2 29	19.7		2 28	51.8		+6.84	-2.79
69 10	2 32	20.8		2 31	52.7		2 31	24.5		2 30	56.4		2 30	28.2		2 30	00.1		6.95	2.81
69 20	2 33	31.3		2 33	02.9		2 32	34.6		2 32	06.2		2 31	37.9		2 31	09.5		7.06	2.84
69 30	2 34	43.0		2 34	14.4		2 33	45.8		2 33	17.2		2 32	48.6		2 32	20.1		7.18	2.86
69 40	2 35	55.8		2 35	27.0		2 34	58.2		2 34	29.4		2 34	00.6		2 33	31.8		7.30	2.88
69 50	2 37	10.0		2 36	40.9		2 36	11.9		2 35	42.9		2 35	13.8		2 34	44.8		7.43	2.90
70 00	2 38	25.3		2 37	56.1		2 37	26.8		2 36	57.5		2 36	28.3		2 35	59.0		+7.56	-2.93

AUXILIARY TABLE

FOR REDUCING TO ELONGATION OBSERVATIONS MADE NEAR ELONGATION

Azimuth at Elong. *Time	0°50'	1°00'	1°10'	1°20'	1°30'	1°40'	1°50'	2°00'	Azimuth at Elong. *Time
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
1	0.0	0.0	0.0	0.0	+ 0.1	+ 0.1	+ 0.1	+ 0.1	1
2	+ 0.1	+ 0.1	+ 0.2	+ 0.2	0.2	0.2	0.3	0.3	2
3	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	3
4	0.5	0.5	0.6	0.7	0.8	0.9	1.0	1.1	4
5	+ 0.7	+ 0.9	+ 1.0	+ 1.1	+ 1.3	+ 1.4	+ 1.6	+ 1.7	5
6	1.0	1.2	1.4	1.6	1.8	2.1	2.3	2.5	6
7	1.4	1.7	2.0	2.2	2.5	2.8	3.1	3.4	7
8	1.8	2.2	2.6	2.9	3.3	3.7	4.0	4.4	8
9	2.3	2.8	3.2	3.7	4.2	4.6	5.1	5.6	9
10	+ 2.9	+ 3.4	+ 4.0	+ 4.6	+ 5.1	+ 5.7	+ 6.3	+ 6.9	10
11	3.5	4.1	4.8	5.5	6.2	6.9	7.6	8.3	11
12	4.1	4.9	5.8	6.6	7.4	8.2	9.0	9.9	12
13	4.8	5.8	6.8	7.7	8.7	9.7	10.6	11.6	13
14	5.6	6.7	7.8	9.0	10.1	11.2	12.3	13.4	14
15	+ 6.4	+ 7.7	+ 9.0	+10.3	+11.6	+12.8	+14.1	+15.4	15
16	7.3	8.8	10.2	11.7	13.2	14.6	16.1	17.5	16
17	8.2	9.9	11.5	13.2	14.9	16.5	18.2	19.8	17
18	9.2	11.1	12.9	14.8	16.7	18.5	20.4	22.2	18
19	10.3	12.4	14.4	16.5	18.6	20.6	22.7	24.7	19
20	+11.4	+13.7	+16.0	+18.3	+20.6	+22.8	+25.1	+27.4	20
21	12.6	15.1	17.6	20.1	22.7	25.2	27.7	30.2	21
22	13.8	16.6	19.3	22.1	24.9	27.6	30.4	33.2	22
23	15.1	18.1	21.1	24.2	27.2	30.2	33.2	36.2	23
24	16.4	19.7	23.0	26.3	29.6	32.9	36.2	39.5	24
25	+17.8	+21.4	+25.0	+28.5	+32.1	+35.7	+39.2	+42.8	25

Azimuth at Elong. *Time	2°00'	2°10'	2°20'	2°30'	2°40'	2°50'	3°00'	3°10'	Azimuth at Elong. *Time
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	1
2	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	2
3	0.6	0.7	0.7	0.8	0.8	0.9	0.9	1.0	3
4	1.1	1.2	1.3	1.4	1.5	1.6	1.6	1.7	4
5	+ 1.7	+ 1.9	+ 2.0	+ 2.1	+ 2.3	+ 2.4	+ 2.6	+ 2.7	5
6	2.5	2.7	2.9	3.1	3.3	3.5	3.7	3.9	6
7	3.4	3.7	3.9	4.2	4.5	4.8	5.0	5.3	7
8	4.4	4.8	5.1	5.5	5.9	6.2	6.6	7.0	8
9	5.6	6.0	6.5	7.0	7.4	7.9	8.3	8.8	9
10	+ 6.9	+ 7.4	+ 8.0	+ 8.6	+ 9.2	+ 9.7	+10.3	+10.9	10
11	8.3	9.0	9.7	10.4	11.1	11.8	12.4	13.1	11
12	9.9	10.7	11.5	12.3	13.2	14.0	14.8	15.6	12
13	11.6	12.6	13.5	14.5	15.4	16.4	17.4	18.4	13
14	13.4	14.6	15.7	16.8	17.9	19.0	20.2	21.3	14
15	+15.4	+16.7	+18.0	+19.3	+20.6	+21.9	+23.1	+24.4	15
16	17.5	19.0	20.5	21.9	23.4	24.9	26.3	27.8	16
17	19.8	21.5	23.1	24.8	26.4	28.1	29.7	31.4	17
18	22.2	24.1	25.9	27.8	29.6	31.5	33.3	35.2	18
19	24.7	26.8	28.9	30.9	33.0	35.1	37.1	39.2	19
20	+27.4	+29.7	+32.0	+34.3	+36.6	+38.8	+41.1	+43.4	20
21	30.2	32.7	35.2	37.8	40.3	42.8	45.3	47.9	21
22	33.2	35.9	38.7	41.5	44.2	47.0	49.8	52.5	22
23	36.2	39.3	42.3	45.3	48.3	51.4	54.4	57.4	23
24	39.5	42.8	46.0	49.3	52.6	55.9	59.2	62.5	24
25	+42.8	+46.4	+49.9	+53.5	+57.1	+60.7	+64.2	+67.8	25

TABLE XII

CONVERSION OF ARC TO TIME

DEGREES						MINUTES			SECONDS					
°	h	m	°	h	m	°	h	m	"	s	"	s	"	s
0	0	00	60	4	00	120	8	00	0	0.000	0.00	0.000	0.50	0.033
1	0	04	61	4	04	121	8	04	1	0.067	.01	.001	.51	.034
2	0	08	62	4	08	122	8	08	2	0.133	.02	.001	.52	.035
3	0	12	63	4	12	123	8	12	3	0.200	.03	.002	.53	.035
4	0	16	64	4	16	124	8	16	4	0.267	.04	.003	.54	.036
5	0	20	65	4	20	125	8	20	5	0.333	0.05	0.003	0.55	0.037
6	0	24	66	4	24	126	8	24	6	0.400	.06	.004	.56	.037
7	0	28	67	4	28	127	8	28	7	0.467	.07	.005	.57	.038
8	0	32	68	4	32	128	8	32	8	0.533	.08	.005	.58	.039
9	0	36	69	4	36	129	8	36	9	0.600	.09	.006	.59	.039
10	0	40	70	4	40	130	8	40	10	0.667	0.10	0.007	0.60	0.040
11	0	44	71	4	44	131	8	44	11	0.733	.11	.007	.61	.041
12	0	48	72	4	48	132	8	48	12	0.800	.12	.008	.62	.041
13	0	52	73	4	52	133	8	52	13	0.867	.13	.009	.63	.042
14	0	56	74	4	56	134	8	56	14	0.933	.14	.009	.64	.043
15	1	00	75	5	00	135	9	00	15	1.000	0.15	0.010	0.65	0.043
16	1	04	76	5	04	136	9	04	16	1.067	.16	.011	.66	.044
17	1	08	77	5	08	137	9	08	17	1.133	.17	.011	.67	.045
18	1	12	78	5	12	138	9	12	18	1.200	.18	.012	.68	.045
19	1	16	79	5	16	139	9	16	19	1.267	.19	.013	.69	.046
20	1	20	80	5	20	140	9	20	20	1.333	0.20	0.013	0.70	0.047
21	1	24	81	5	24	141	9	24	21	1.400	.21	.014	.71	.047
22	1	28	82	5	28	142	9	28	22	1.467	.22	.015	.72	.048
23	1	32	83	5	32	143	9	32	23	1.533	.23	.015	.73	.049
24	1	36	84	5	36	144	9	36	24	1.600	.24	.016	.74	.049
25	1	40	85	5	40	145	9	40	25	1.667	0.25	0.017	0.75	0.050
26	1	44	86	5	44	146	9	44	26	1.733	.26	.017	.76	.051
27	1	48	87	5	48	147	9	48	27	1.800	.27	.018	.77	.051
28	1	52	88	5	52	148	9	52	28	1.867	.28	.019	.78	.052
29	1	56	89	5	56	149	9	56	29	1.933	.29	.019	.79	.053
30	2	00	90	6	00	150	10	00	30	2.000	0.30	0.020	0.80	0.053
31	2	04	91	6	04	151	10	04	31	2.067	.31	.021	.81	.054
32	2	08	92	6	08	152	10	08	32	2.133	.32	.021	.82	.055
33	2	12	93	6	12	153	10	12	33	2.200	.33	.022	.83	.055
34	2	16	94	6	16	154	10	16	34	2.267	.34	.023	.84	.056
35	2	20	95	6	20	155	10	20	35	2.333	0.35	0.023	0.85	0.057
36	2	24	96	6	24	156	10	24	36	2.400	.36	.024	.86	.057
37	2	28	97	6	28	157	10	28	37	2.467	.37	.025	.87	.058
38	2	32	98	6	32	158	10	32	38	2.533	.38	.025	.88	.059
39	2	36	99	6	36	159	10	36	39	2.600	.39	.026	.89	.059
40	2	40	100	6	40	160	10	40	40	2.667	0.40	0.027	0.90	0.060
41	2	44	101	6	44	161	10	44	41	2.733	.41	.027	.91	.061
42	2	48	102	6	48	162	10	48	42	2.800	.42	.028	.92	.061
43	2	52	103	6	52	163	10	52	43	2.867	.43	.029	.93	.062
44	2	56	104	6	56	164	10	56	44	2.933	.44	.029	.94	.063
45	3	00	105	7	00	165	11	00	45	3.000	0.45	0.030	0.95	0.063
46	3	04	106	7	04	166	11	04	46	3.067	.46	.031	.96	.064
47	3	08	107	7	08	167	11	08	47	3.133	.47	.031	.97	.065
48	3	12	108	7	12	168	11	12	48	3.200	.48	.032	.98	.065
49	3	16	109	7	16	169	11	16	49	3.267	.49	.033	0.99	.066
50	3	20	110	7	20	170	11	20	50	3.333	0.50	0.033	1.00	0.067
51	3	24	111	7	24	171	11	24	51	3.400				
52	3	28	112	7	28	172	11	28	52	3.467				
53	3	32	113	7	32	173	11	32	53	3.533				
54	3	36	114	7	36	174	11	36	54	3.600				
55	3	40	115	7	40	175	11	40	55	3.667				
56	3	44	116	7	44	176	11	44	56	3.733				
57	3	48	117	7	48	177	11	48	57	3.800				
58	3	52	118	7	52	178	11	52	58	3.867				
59	3	56	119	7	56	179	11	56	59	3.933				

90° = 6^h

180° = 12^h

270° = 18^h

CONVERSION OF HOURS, MINUTES, AND SECONDS TO DECIMALS OF A DAY

	0 ^h	1 ^h	2 ^h	3 ^h	4 ^h	5 ^h	SECONDS	
m	d	d	d	d	d	d	s	d
0	0.000 000	0.041 667	0.083 333	0.125 000	0.166 667	0.208 333	0	0.000 000
1	.000 694	.042 361	.084 028	.125 694	.167 361	.209 028	1	.000 012
2	.001 389	.043 056	.084 722	.126 389	.168 056	.209 722	2	.000 023
3	.002 083	.043 750	.085 417	.127 083	.168 750	.210 417	3	.000 035
4	.002 778	.044 444	.086 111	.127 778	.169 444	.211 111	4	.000 046
5	0.003 472	0.045 139	0.086 806	0.128 472	0.170 139	0.211 806	5	0.000 058
6	.004 167	.045 833	.087 500	.129 167	.170 833	.212 500	6	.000 069
7	.004 861	.046 528	.088 194	.129 861	.171 528	.213 194	7	.000 081
8	.005 556	.047 222	.088 889	.130 556	.172 222	.213 889	8	.000 093
9	.006 250	.047 917	.089 583	.131 250	.172 917	.214 583	9	.000 104
10	0.006 944	0.048 611	0.090 278	0.131 944	0.173 611	0.215 278	10	0.000 116
11	.007 639	.049 306	.090 972	.132 639	.174 306	.215 972	11	.000 127
12	.008 333	.050 000	.091 667	.133 333	.175 000	.216 667	12	.000 139
13	.009 028	.050 694	.092 361	.134 028	.175 694	.217 361	13	.000 150
14	.009 722	.051 389	.093 056	.134 722	.176 389	.218 056	14	.000 162
15	0.010 417	0.052 083	0.093 750	0.135 417	0.177 083	0.218 750	15	0.000 174
16	.011 111	.052 778	.094 444	.136 111	.177 778	.219 444	16	.000 185
17	.011 806	.053 472	.095 139	.136 806	.178 472	.220 139	17	.000 197
18	.012 500	.054 167	.095 833	.137 500	.179 167	.220 833	18	.000 208
19	.013 194	.054 861	.096 528	.138 194	.179 861	.221 528	19	.000 220
20	0.013 889	0.055 556	0.097 222	0.138 889	0.180 556	0.222 222	20	0.000 231
21	.014 583	.056 250	.097 917	.139 583	.181 250	.222 917	21	.000 243
22	.015 278	.056 944	.098 611	.140 278	.181 944	.223 611	22	.000 255
23	.015 972	.057 639	.099 306	.140 972	.182 639	.224 306	23	.000 266
24	.016 667	.058 333	.100 000	.141 667	.183 333	.225 000	24	.000 278
25	0.017 361	0.059 028	0.100 694	0.142 361	0.184 028	0.225 694	25	0.000 289
26	.018 056	.059 722	.101 389	.143 056	.184 722	.226 389	26	.000 301
27	.018 750	.060 417	.102 083	.143 750	.185 417	.227 083	27	.000 312
28	.019 444	.061 111	.102 778	.144 444	.186 111	.227 778	28	.000 324
29	.020 139	.061 806	.103 472	.145 139	.186 806	.228 472	29	.000 336
30	0.020 833	0.062 500	0.104 167	0.145 833	0.187 500	0.229 167	30	0.000 347
31	.021 528	.063 194	.104 861	.146 528	.188 194	.229 861	31	.000 359
32	.022 222	.063 889	.105 556	.147 222	.188 889	.230 556	32	.000 370
33	.022 917	.064 583	.106 250	.147 917	.189 583	.231 250	33	.000 382
34	.023 611	.065 278	.106 944	.148 611	.190 278	.231 944	34	.000 394
35	0.024 306	0.065 972	0.107 639	0.149 306	0.190 972	0.232 639	35	0.000 405
36	.025 000	.066 667	.108 333	.150 000	.191 667	.233 333	36	.000 417
37	.025 694	.067 361	.109 028	.150 694	.192 361	.234 028	37	.000 428
38	.026 389	.068 056	.109 722	.151 389	.193 056	.234 722	38	.000 440
39	.027 083	.068 750	.110 417	.152 083	.193 750	.235 417	39	.000 451
40	0.027 778	0.069 444	0.111 111	0.152 778	0.194 444	0.236 111	40	0.000 463
41	.028 472	.070 139	.111 806	.153 472	.195 139	.236 806	41	.000 475
42	.029 167	.070 833	.112 500	.154 167	.195 833	.237 500	42	.000 486
43	.029 861	.071 528	.113 194	.154 861	.196 528	.238 194	43	.000 498
44	.030 556	.072 222	.113 889	.155 556	.197 222	.238 889	44	.000 509
45	0.031 250	0.072 917	0.114 583	0.156 250	0.197 917	0.239 583	45	0.000 521
46	.031 944	.073 611	.115 278	.156 944	.198 611	.240 278	46	.000 532
47	.032 639	.074 306	.115 972	.157 639	.199 306	.240 972	47	.000 544
48	.033 333	.075 000	.116 667	.158 333	.200 000	.241 667	48	.000 556
49	.034 028	.075 694	.117 361	.159 028	.200 694	.242 361	49	.000 567
50	0.034 722	0.076 389	0.118 056	0.159 722	0.201 389	0.243 056	50	0.000 579
51	.035 417	.077 083	.118 750	.160 417	.202 083	.243 750	51	.000 590
52	.036 111	.077 778	.119 444	.161 111	.202 778	.244 444	52	.000 602
53	.036 806	.078 472	.120 139	.161 806	.203 472	.245 139	53	.000 613
54	.037 500	.079 167	.120 833	.162 500	.204 167	.245 833	54	.000 625
55	0.038 194	0.079 861	0.121 528	0.163 194	0.204 861	0.246 528	55	0.000 637
56	.038 889	.080 556	.122 222	.163 889	.205 556	.247 222	56	.000 648
57	.039 583	.081 250	.122 917	.164 583	.206 250	.247 917	57	.000 660
58	.040 278	.081 944	.123 611	.165 278	.206 944	.248 611	58	.000 671
59	0.040 972	0.082 639	0.124 306	0.165 972	0.207 639	0.249 306	59	0.000 683

TABLE X

CONVERSION OF HOURS, MINUTES, AND SECONDS TO DECIMALS OF A DAY

	6 ^h	7 ^h	8 ^h	9 ^h	10 ^h	11 ^h	SECONDS	
m	d	d	d	d	d	d	s	d
0	0.250 000	0.291 667	0.333 333	0.375 000	0.416 667	0.458 333	0	0.000 000
1	.250 694	.292 361	.334 028	.375 694	.417 361	.459 028	1	.000 012
2	.251 389	.293 056	.334 722	.376 389	.418 056	.459 722	2	.000 023
3	.252 083	.293 750	.335 417	.377 083	.418 750	.460 417	3	.000 035
4	.252 778	.294 444	.336 111	.377 778	.419 444	.461 111	4	.000 046
5	0.253 472	0.295 139	0.336 806	0.378 472	0.420 139	0.461 806	5	0.000 058
6	.254 167	.295 833	.337 500	.379 167	.420 833	.462 500	6	.000 069
7	.254 861	.296 528	.338 194	.379 861	.421 528	.463 194	7	.000 081
8	.255 556	.297 222	.338 889	.380 556	.422 222	.463 889	8	.000 093
9	.256 250	.297 917	.339 583	.381 250	.422 917	.464 583	9	.000 104
10	0.256 944	0.298 611	0.340 278	0.381 944	0.423 611	0.465 278	10	0.000 116
11	.257 639	.299 306	.340 972	.382 639	.424 306	.465 972	11	.000 127
12	.258 333	.300 000	.341 667	.383 333	.425 000	.466 667	12	.000 139
13	.259 028	.300 694	.342 361	.384 028	.425 694	.467 361	13	.000 150
14	.259 722	.301 389	.343 056	.384 722	.426 389	.468 056	14	.000 162
15	0.260 417	0.302 083	0.343 750	0.385 417	0.427 083	0.468 750	15	0.000 174
16	.261 111	.302 778	.344 444	.386 111	.427 778	.469 444	16	.000 185
17	.261 806	.303 472	.345 139	.386 806	.428 472	.470 139	17	.000 197
18	.262 500	.304 167	.345 833	.387 500	.429 167	.470 833	18	.000 208
19	.263 194	.304 861	.346 528	.388 194	.429 861	.471 528	19	.000 220
20	0.263 889	0.305 556	0.347 222	0.388 889	0.430 556	0.472 222	20	0.000 231
21	.264 583	.306 250	.347 917	.389 583	.431 250	.472 917	21	.000 243
22	.265 278	.306 944	.348 611	.390 278	.431 944	.473 611	22	.000 255
23	.265 972	.307 639	.349 306	.390 972	.432 639	.474 306	23	.000 266
24	.266 667	.308 333	.350 000	.391 667	.433 333	.475 000	24	.000 278
25	0.267 361	0.309 028	0.350 694	0.392 361	0.434 028	0.475 694	25	0.000 289
26	.268 056	.309 722	.351 389	.393 056	.434 722	.476 389	26	.000 301
27	.268 750	.310 417	.352 083	.393 750	.435 417	.477 083	27	.000 312
28	.269 444	.311 111	.352 778	.394 444	.436 111	.477 778	28	.000 324
29	.270 139	.311 806	.353 472	.395 139	.436 806	.478 472	29	.000 336
30	0.270 833	0.312 500	0.354 167	0.395 833	0.437 500	0.479 167	30	0.000 347
31	.271 528	.313 194	.354 861	.396 528	.438 194	.479 861	31	.000 359
32	.272 222	.313 889	.355 556	.397 222	.438 889	.480 556	32	.000 370
33	.272 917	.314 583	.356 250	.397 917	.439 583	.481 250	33	.000 382
34	.273 611	.315 278	.356 944	.398 611	.440 278	.481 944	34	.000 394
35	0.274 306	0.315 972	0.357 639	0.399 306	0.440 972	0.482 639	35	0.000 405
36	.275 000	.316 667	.358 333	.400 000	.441 667	.483 333	36	.000 417
37	.275 694	.317 361	.359 028	.400 694	.442 361	.484 028	37	.000 428
38	.276 389	.318 056	.359 722	.401 389	.443 056	.484 722	38	.000 440
39	.277 083	.318 750	.360 417	.402 083	.443 750	.485 417	39	.000 451
40	0.277 778	0.319 444	0.361 111	0.402 778	0.444 444	0.486 111	40	0.000 463
41	.278 472	.320 139	.361 806	.403 472	.445 139	.486 806	41	.000 475
42	.279 167	.320 833	.362 500	.404 167	.445 833	.487 500	42	.000 486
43	.279 861	.321 528	.363 194	.404 861	.446 528	.488 194	43	.000 498
44	.280 556	.322 222	.363 889	.405 556	.447 222	.488 889	44	.000 509
45	0.281 250	0.322 917	0.364 583	0.406 250	0.447 917	0.489 583	45	0.000 521
46	.281 944	.323 611	.365 278	.406 944	.448 611	.490 278	46	.000 532
47	.282 639	.324 306	.365 972	.407 639	.449 306	.490 972	47	.000 544
48	.283 333	.325 000	.366 667	.408 333	.450 000	.491 667	48	.000 556
49	.284 028	.325 694	.367 361	.409 028	.450 694	.492 361	49	.000 567
50	0.284 722	0.326 389	0.368 056	0.409 722	0.451 389	0.493 056	50	0.000 579
51	.285 417	.327 083	.368 750	.410 417	.452 083	.493 750	51	.000 590
52	.286 111	.327 778	.369 444	.411 111	.452 778	.494 444	52	.000 602
53	.286 806	.328 472	.370 139	.411 806	.453 472	.495 139	53	.000 613
54	.287 500	.329 167	.370 833	.412 500	.454 167	.495 833	54	.000 625
55	0.288 194	0.329 861	0.371 528	0.413 194	0.454 861	0.496 528	55	0.000 637
56	.288 889	.330 556	.372 222	.413 889	.455 556	.497 222	56	.000 648
57	.289 583	.331 250	.372 917	.414 583	.456 250	.497 917	57	.000 660
58	.290 278	.331 944	.373 611	.415 278	.456 944	.498 611	58	.000 671
59	0.290 972	0.332 639	0.374 306	0.415 972	0.457 639	0.499 306	59	0.000 683

EQUATION OF TIME, 1966

APPARENT—MEAN

FOR 0^h UNIVERSAL TIME

DAY	JANUARY			FEBRUARY			MARCH			APRIL			MAY			JUNE		
	E. of T.		Δ(E. of T.)	E. of T.		Δ(E. of T.)	E. of T.		Δ(E. of T.)	E. of T.		Δ(E. of T.)	E. of T.		Δ(E. of T.)	E. of T.		Δ(E. of T.)
	m	s	s	m	s	s	m	s	s	m	s	s	m	s	s	m	s	s
1	- 3	15.68	-28.35	-13	33.09	- 8.11	-12	34.16	+11.64	- 4	08.88	+18.02	+ 2	50.82	+ 7.53	+ 2	24.64	- 8.92
2	- 3	44.03	-28.01	-13	41.20	- 7.28	-12	22.52	+12.15	- 3	50.86	+17.93	+ 2	58.35	+ 7.01	+ 2	15.72	- 9.31
3	- 4	12.04	-27.63	-13	48.48	- 6.43	-12	10.37	+12.66	- 3	32.93	+17.81	+ 3	05.36	+ 6.46	+ 2	06.41	- 9.68
4	- 4	39.67	-27.21	-13	54.91	- 5.63	-11	57.71	+13.13	- 3	15.12	+17.66	+ 3	11.82	+ 5.92	+ 1	56.73	-10.04
5	- 5	06.88	-26.79	-14	00.54	- 4.80	-11	44.58	+13.59	- 2	57.46	+17.50	+ 3	17.74	+ 5.35	+ 1	46.69	-10.40
6	- 5	33.67	-26.33	-14	05.34	- 4.01	-11	30.99	+14.01	- 2	39.96	+17.30	+ 3	23.09	+ 4.80	+ 1	36.29	-10.72
7	- 6	00.00	-25.86	-14	09.35	- 3.21	-11	16.98	+14.43	- 2	22.66	+17.08	+ 3	27.89	+ 4.21	+ 1	25.57	-11.04
8	- 6	25.86	-25.36	-14	12.56	- 2.43	-11	02.55	+14.81	- 2	05.58	+16.85	+ 3	32.10	+ 3.65	+ 1	14.53	-11.34
9	- 6	51.22	-24.84	-14	14.99	- 1.65	-10	47.74	+15.17	- 1	48.73	+16.59	+ 3	35.75	+ 3.05	+ 1	03.19	-11.62
10	- 7	16.06	-24.32	-14	16.64	- 0.89	-10	32.57	+15.50	- 1	32.14	+16.31	+ 3	38.80	+ 2.46	+ 0	51.57	-11.87
11	- 7	40.38	-23.74	-14	17.53	- 0.13	-10	17.07	+15.81	- 1	15.83	+16.03	+ 3	41.26	+ 1.87	+ 0	39.70	-12.11
12	- 8	04.12	-23.17	-14	17.66	+ 0.60	-10	01.26	+16.11	- 0	59.80	+15.71	+ 3	43.13	+ 1.29	+ 0	27.59	-12.34
13	- 8	27.29	-22.57	-14	17.06	+ 1.35	- 9	45.15	+16.38	- 0	44.09	+15.39	+ 3	44.42	+ 0.69	+ 0	15.25	-12.53
14	- 8	49.86	-21.96	-14	15.71	+ 2.07	- 9	28.77	+16.61	- 0	28.70	+15.05	+ 3	45.11	+ 0.11	+ 0	02.72	-12.69
15	- 9	11.82	-21.31	-14	13.64	+ 2.79	- 9	12.16	+16.87	- 0	13.65	+14.68	+ 3	45.22	- 0.49	- 0	09.97	-12.84
16	- 9	33.13	-20.65	-14	10.85	+ 3.49	- 8	55.29	+17.07	+ 0	01.03	+14.32	+ 3	44.73	- 1.06	- 0	22.81	-12.96
17	- 9	53.78	-19.97	-14	07.36	+ 4.20	- 8	38.22	+17.26	+ 0	15.35	+13.94	+ 3	43.67	- 1.63	- 0	35.77	-13.07
18	-10	13.75	-19.27	-14	03.16	+ 4.88	- 8	20.96	+17.45	+ 0	29.29	+13.54	+ 3	42.04	- 2.21	- 0	48.84	-13.12
19	-10	33.02	-18.56	-13	58.28	+ 5.57	- 8	03.51	+17.60	+ 0	42.83	+13.13	+ 3	39.83	- 2.76	- 1	01.96	-13.16
20	-10	51.58	-17.81	-13	52.71	+ 6.22	- 7	45.91	+17.74	+ 0	55.96	+12.71	+ 3	37.07	- 3.31	- 1	15.12	-13.18
21	-11	09.39	-17.06	-13	46.49	+ 6.89	- 7	28.17	+17.85	+ 1	08.67	+12.28	+ 3	33.76	- 3.86	- 1	28.30	-13.14
22	-11	26.45	-16.31	-13	39.60	+ 7.52	- 7	10.32	+17.96	+ 1	20.95	+11.86	+ 3	29.90	- 4.38	- 1	41.44	-13.10
23	-11	42.76	-15.51	-13	32.08	+ 8.16	- 6	52.36	+18.06	+ 1	32.81	+11.39	+ 3	25.52	- 4.89	- 1	54.54	-13.02
24	-11	58.27	-14.73	-13	23.92	+ 8.77	- 6	34.30	+18.11	+ 1	44.20	+10.95	+ 3	20.63	- 5.39	- 2	07.56	-12.93
25	-12	13.00	-13.91	-13	15.15	+ 9.38	- 6	16.19	+18.17	+ 1	55.15	+10.48	+ 3	15.24	- 5.88	- 2	20.49	-12.78
26	-12	26.91	-13.11	-13	05.77	+ 9.97	- 5	58.02	+18.21	+ 2	05.63	+10.02	+ 3	09.36	- 6.34	- 2	33.27	-12.65
27	-12	40.02	-12.28	-12	55.80	+10.54	- 5	39.81	+18.22	+ 2	15.65	+ 9.53	+ 3	03.02	- 6.81	- 2	45.92	-12.47
28	-12	52.30	-11.44	-12	45.26	+11.10	- 5	21.59	+18.23	+ 2	25.18	+ 9.05	+ 2	56.21	- 7.25	- 2	58.39	-12.28
29	-13	03.74	-10.63				- 5	03.36	+18.20	+ 2	34.23	+ 8.55	+ 2	48.96	- 7.69	- 3	10.67	-12.06
30	-13	14.37	- 9.78				- 4	45.16	+18.17	+ 2	42.78	+ 8.04	+ 2	41.27	- 8.10	- 3	22.73	-11.84
31	-13	24.15	- 8.94				- 4	26.99	+18.11				+ 2	33.17	- 8.53			

EQUATION OF TIME, 1966

APPARENT—MEAN

FOR 0^h UNIVERSAL TIME

DAY	JULY			AUGUST			SEPTEMBER			OCTOBER			NOVEMBER			DECEMBER		
	E. of T.		Δ(E. of T.)	E. of T.		Δ(E. of T.)	E. of T.		Δ(E. of T.)	E. of T.		Δ(E. of T.)	E. of T.		Δ(E. of T.)	E. of T.		Δ(E. of T.)
	m	s	"	m	s	"	m	s	"	m	s	"	m	s	"	m	s	"
1	- 3	34.57	-11.58	- 6	18.25	+ 3.55	- 0	14.68	+18.94	+10	02.98	+19.45	+16	21.20	+ 1.82	+11	14.82	-22.21
2	- 3	46.15	-11.33	- 6	14.70	+ 4.16	+ 0	04.26	+19.22	+10	22.43	+19.14	+16	23.02	+ 1.02	+10	52.61	-22.86
3	- 3	57.48	-11.04	- 6	10.54	+ 4.75	+ 0	23.48	+19.50	+10	41.57	+18.82	+16	24.04	+ 0.18	+10	29.75	-23.50
4	- 4	08.52	-10.74	- 6	05.79	+ 5.34	+ 0	42.98	+19.74	+11	00.39	+18.48	+16	24.22	- 0.65	+10	06.25	-24.11
5	- 4	19.26	-10.42	- 6	00.45	+ 5.94	+ 1	02.72	+19.96	+11	18.87	+18.10	+16	23.57	- 1.50	+ 9	42.14	-24.70
6	- 4	29.68	-10.09	- 5	54.51	+ 6.52	+ 1	22.68	+20.18	+11	36.97	+17.72	+16	22.07	- 2.35	+ 9	17.44	-25.27
7	- 4	39.77	- 9.74	- 5	47.99	+ 7.09	+ 1	42.86	+20.35	+11	54.69	+17.29	+16	19.72	- 3.19	+ 8	52.17	-25.80
8	- 4	49.51	- 9.38	- 5	40.90	+ 7.67	+ 2	03.21	+20.53	+12	11.98	+16.86	+16	16.53	- 4.06	+ 8	26.37	-26.32
9	- 4	58.89	- 8.99	- 5	33.23	+ 8.24	+ 2	23.74	+20.68	+12	28.84	+16.42	+16	12.47	- 4.92	+ 8	00.05	-26.80
10	- 5	07.88	- 8.59	- 5	24.99	+ 8.79	+ 2	44.42	+20.81	+12	45.26	+15.94	+16	07.55	- 5.78	+ 7	33.25	-27.24
11	- 5	16.47	- 8.18	- 5	16.20	+ 9.35	+ 3	05.23	+20.92	+13	01.20	+15.46	+16	01.77	- 6.65	+ 7	06.01	-27.65
12	- 5	24.65	- 7.75	- 5	06.85	+ 9.90	+ 3	26.15	+21.03	+13	16.66	+14.96	+15	55.12	- 7.49	+ 6	38.36	-28.03
13	- 5	32.40	- 7.31	- 4	56.95	+10.43	+ 3	47.18	+21.10	+13	31.62	+14.45	+15	47.63	- 8.34	+ 6	10.33	-28.36
14	- 5	39.71	- 6.83	- 4	46.52	+10.97	+ 4	08.28	+21.17	+13	46.07	+13.91	+15	39.29	- 9.19	+ 5	41.97	-28.68
15	- 5	46.54	- 6.36	- 4	35.55	+11.51	+ 4	29.45	+21.22	+13	59.98	+13.36	+15	30.10	-10.02	+ 5	13.29	-28.94
16	- 5	52.90	- 5.88	- 4	24.04	+12.03	+ 4	50.67	+21.27	+14	13.34	+12.82	+15	20.08	-10.85	+ 4	44.35	-29.17
17	- 5	58.78	- 5.35	- 4	12.01	+12.55	+ 5	11.94	+21.28	+14	26.16	+12.24	+15	09.23	-11.67	+ 4	15.18	-29.36
18	- 6	04.13	- 4.82	- 3	59.46	+13.07	+ 5	33.22	+21.29	+14	38.40	+11.66	+14	57.56	-12.49	+ 3	45.82	-29.53
19	- 6	08.95	- 4.28	- 3	46.39	+13.57	+ 5	54.51	+21.27	+14	50.06	+11.05	+14	45.07	-13.29	+ 3	16.29	-29.66
20	- 6	13.23	- 3.71	- 3	32.82	+14.09	+ 6	15.78	+21.25	+15	01.11	+10.45	+14	31.78	-14.10	+ 2	46.63	-29.74
21	- 6	16.94	- 3.14	- 3	18.73	+14.58	+ 6	37.03	+21.19	+15	11.56	+ 9.81	+14	17.68	-14.90	+ 2	16.89	-29.82
22	- 6	20.08	- 2.56	- 3	04.15	+15.04	+ 6	58.22	+21.12	+15	21.37	+ 9.16	+14	02.78	-15.67	+ 1	47.07	-29.84
23	- 6	22.64	- 1.95	- 2	49.11	+15.52	+ 7	19.34	+21.03	+15	30.53	+ 8.49	+13	47.11	-16.45	+ 1	17.23	-29.83
24	- 6	24.59	- 1.36	- 2	33.59	+15.96	+ 7	40.37	+20.90	+15	39.02	+ 7.82	+13	30.66	-17.20	+ 0	47.40	-29.79
25	- 6	25.95	- 0.74	- 2	17.63	+16.40	+ 8	01.27	+20.77	+15	46.84	+ 7.12	+13	13.46	-17.97	+ 0	17.61	-29.72
26	- 6	26.69	- 0.13	- 2	01.23	+16.82	+ 8	22.04	+20.61	+15	53.96	+ 6.41	+12	55.49	-18.70	- 0	12.11	-29.61
27	- 6	26.82	+ 0.49	- 1	44.41	+17.22	+ 8	42.65	+20.41	+16	00.37	+ 5.69	+12	36.79	-19.43	- 0	41.72	-29.50
28	- 6	26.33	+ 1.10	- 1	27.19	+17.60	+ 9	03.06	+20.21	+16	06.06	+ 4.94	+12	17.36	-20.15	- 1	11.22	-29.33
29	- 6	25.23	+ 1.71	- 1	09.59	+17.97	+ 9	23.27	+19.99	+16	11.00	+ 4.17	+11	57.21	-20.86	- 1	40.55	-29.15
30	- 6	23.52	+ 2.33	- 0	51.62	+18.31	+ 9	43.26	+19.72	+16	15.17	+ 3.42	+11	36.35	-21.53	- 2	09.70	-28.93
31	- 6	21.19	+ 2.94	- 0	33.31	+18.63				+16	18.59	+ 2.61				- 2	38.63	-28.68

POLARIS, 1966

JANUARY

FEBRUARY

MARCH

DAY OF MONTH	GREENWICH HOUR ANGLE FOR 0 ^h UNIVERSAL TIME	APPARENT DECLINATION	MEAN TIME GREENWICH TRANSIT	GREENWICH HOUR ANGLE FOR 0 ^h UNIVERSAL TIME	APPARENT DECLINATION	MEAN TIME GREENWICH TRANSIT	GREENWICH HOUR ANGLE FOR 0 ^h UNIVERSAL TIME	APPARENT DECLINATION	MEAN TIME GREENWICH TRANSIT
	° ' "	° ' "	h m s	° ' "	° ' "	h m s	° ' "	° ' "	h m s
1	70 08 17.5	+89 06 41.08	19 16 16	100 52 03.2	+89 06 43.50	17 13 41	128 36 56.2	+89 06 40.47	15 23 00
2	71 07 43.8	89 06 41.21	19 12 19	101 51 29.6	89 06 43.49	17 09 44	129 36 18.6	89 06 40.30	15 19 03
3	72 07 09.1	89 06 41.34	19 08 22	102 50 56.8	89 06 43.50	17 05 47	130 35 41.8	89 06 40.16	15 15 06
4	73 06 33.6	89 06 41.49	19 04 25	103 50 25.2	89 06 43.52	17 01 49	131 35 06.4	89 06 40.02	15 11 09
5	74 05 58.0	89 06 41.66	19 00 28	104 49 55.4	89 06 43.53	16 57 52	132 34 32.3	89 06 39.86	15 07 12
6	75 05 22.7	+89 06 41.84	18 56 31	105 49 27.0	+89 06 43.52	16 53 55	133 33 58.9	+89 06 39.68	15 03 15
7	76 04 48.9	89 06 42.03	18 52 34	106 48 59.2	89 06 43.49	16 49 57	134 33 25.5	89 06 39.47	14 59 18
8	77 04 17.1	89 06 42.23	18 48 36	107 48 31.0	89 06 43.42	16 46 00	135 32 51.0	89 06 39.23	14 55 21
9	78 03 47.1	89 06 42.42	18 44 39	108 48 01.7	89 06 43.32	16 42 02	136 32 14.8	89 06 38.97	14 51 24
10	79 03 18.1	89 06 42.57	18 40 41	109 47 30.7	89 06 43.20	16 38 05	137 31 36.7	89 06 38.70	14 47 27
11	80 02 49.8	+89 06 42.71	18 36 44	110 46 58.2	+89 06 43.08	16 34 08	138 30 56.9	+89 06 38.44	14 43 31
12	81 02 21.1	89 06 42.80	18 32 47	111 46 24.5	89 06 42.96	16 30 11	139 30 15.9	89 06 38.18	14 39 34
13	82 01 51.2	89 06 42.88	18 28 49	112 45 50.1	89 06 42.86	16 26 14	140 29 34.6	89 06 37.94	14 35 37
14	83 01 19.9	89 06 42.94	18 24 52	113 45 15.6	89 06 42.76	16 22 17	141 28 53.5	89 06 37.71	14 31 41
15	84 00 47.5	89 06 43.00	18 20 55	114 44 41.5	89 06 42.67	16 18 20	142 28 12.9	89 06 37.49	14 27 44
16	85 00 14.2	+89 06 43.07	18 16 58	115 44 08.3	+89 06 42.58	16 14 23	143 27 33.0	+89 06 37.27	14 23 47
17	85 59 40.8	89 06 43.14	18 13 01	116 43 35.9	89 06 42.49	16 10 25	144 26 53.9	89 06 37.05	14 19 51
18	86 59 07.5	89 06 43.22	18 09 04	117 43 04.4	89 06 42.40	16 06 28	145 26 15.5	89 06 36.81	14 15 54
19	87 58 35.0	89 06 43.30	18 05 06	118 42 33.6	89 06 42.29	16 02 31	146 25 37.4	89 06 36.57	14 11 57
20	88 58 03.3	89 06 43.39	18 01 09	119 42 03.1	89 06 42.17	15 58 33	147 24 59.2	89 06 36.30	14 08 00
21	89 57 33.0	+89 06 43.48	17 57 12	120 41 32.6	+89 06 42.02	15 54 36	148 24 20.6	+89 06 36.02	14 04 03
22	90 57 03.6	89 06 43.56	17 53 14	121 41 01.9	89 06 41.85	15 50 39	149 23 41.2	89 06 35.72	14 00 07
23	91 56 35.1	89 06 43.61	17 49 17	122 40 30.3	89 06 41.67	15 46 42	150 23 00.5	89 06 35.41	13 56 10
24	92 56 07.1	89 06 43.66	17 45 19	123 39 57.6	89 06 41.47	15 42 45	151 22 18.3	89 06 35.10	13 52 14
25	93 55 39.3	89 06 43.68	17 41 22	124 39 23.5	89 06 41.26	15 38 47	152 21 34.7	89 06 34.77	13 48 17
26	94 55 11.2	+89 06 43.69	17 37 24	125 38 48.2	+89 06 41.05	15 34 51	153 20 49.8	+89 06 34.46	13 44 21
27	95 54 42.4	89 06 43.67	17 33 27	126 38 11.5	89 06 40.84	15 30 54	154 20 03.6	89 06 34.15	13 40 25
28	96 54 12.9	89 06 43.64	17 29 30	127 37 34.0	89 06 40.64	15 26 57	155 19 16.8	89 06 33.87	13 36 29
29	97 53 42.1	89 06 43.60	17 25 32				156 18 30.1	89 06 33.61	13 32 32
30	98 53 10.0	89 06 43.56	17 21 35				157 17 43.9	89 06 33.35	13 28 36
31	99 52 37.0	+89 06 43.52	17 17 38				158 16 58.8	+89 06 33.11	13 24 40

POLARIS, 1966

APRIL

MAY

JUNE

DAY OF MONTH	GREENWICH HOUR ANGLE FOR 0 ^h UNIVERSAL TIME	APPARENT DECLINATION FOR 0 ^h UNIVERSAL TIME	MEAN TIME GREENWICH TRANSIT	GREENWICH HOUR ANGLE FOR 0 ^h UNIVERSAL TIME	APPARENT DECLINATION FOR 0 ^h UNIVERSAL TIME	MEAN TIME GREENWICH TRANSIT	GREENWICH HOUR ANGLE FOR 0 ^h UNIVERSAL TIME	APPARENT DECLINATION FOR 0 ^h UNIVERSAL TIME	MEAN TIME GREENWICH TRANSIT
	° ' "	° ' "	h m s	° ' "	° ' "	h m s	° ' "	° ' "	h m s
1	159 16 14.8	+89 06 32.87	13 20 43	188 50 39.5	+89 06 23.93	11 22 45	219 18 24.5	+89 06 16.24	9 21 15
2	160 15 31.6	89 06 32.61	13 16 47	189 49 44.3	89 06 23.61	11 18 50	220 17 14.7	89 06 16.04	9 17 20
3	161 14 48.7	89 06 32.33	13 12 50	190 48 47.2	89 06 23.29	11 14 54	221 16 04.3	89 06 15.85	9 13 25
4	162 14 05.0	89 06 32.02	13 08 54	191 47 48.3	89 06 22.97	11 10 59	222 14 54.2	89 06 15.70	9 09 31
5	163 13 19.8	89 06 31.69	13 04 58	192 46 47.5	89 06 22.66	11 07 04	223 13 44.7	89 06 15.55	9 05 36
6	164 12 32.5	+89 06 31.35	13 01 01	193 45 45.6	+89 06 22.36	11 03 08	224 12 36.0	+89 06 15.42	9 01 41
7	165 11 43.3	89 06 31.02	12 57 05	194 44 43.4	89 06 22.09	10 59 13	225 11 28.4	89 06 15.29	8 57 46
8	166 10 52.7	89 06 30.69	12 53 09	195 43 41.5	89 06 21.84	10 55 18	226 10 21.6	89 06 15.16	8 53 51
9	167 10 01.2	89 06 30.38	12 49 14	196 42 40.3	89 06 21.60	10 51 23	227 09 15.2	89 06 15.02	8 49 56
10	168 09 09.6	89 06 30.09	12 45 18	197 41 40.0	89 06 21.37	10 47 27	228 08 09.0	89 06 14.88	8 46 01
11	169 08 18.5	+89 06 29.81	12 41 22	198 40 40.5	+89 06 21.13	10 43 32	229 07 02.4	+89 06 14.72	8 42 06
12	170 07 28.0	89 06 29.54	12 37 26	199 39 41.5	89 06 20.90	10 39 36	230 05 55.1	89 06 14.55	8 38 12
13	171 06 38.2	89 06 29.27	12 33 30	200 38 42.7	89 06 20.65	10 35 41	231 04 46.9	89 06 14.38	8 34 17
14	172 05 49.1	89 06 29.00	12 29 33	201 37 43.8	89 06 20.39	10 31 46	232 03 37.3	89 06 14.21	8 30 22
15	173 05 00.5	89 06 28.71	12 25 37	202 36 44.3	89 06 20.11	10 27 50	233 02 26.3	89 06 14.04	8 26 28
16	174 04 11.9	+89 06 28.41	12 21 41	203 35 43.9	+89 06 19.83	10 23 55	234 01 14.0	+89 06 13.90	8 22 33
17	175 03 22.9	89 06 28.10	12 17 45	204 34 42.2	89 06 19.54	10 20 00	235 00 00.9	89 06 13.77	8 18 39
18	176 02 33.2	89 06 27.76	12 13 49	205 33 39.1	89 06 19.25	10 16 05	235 58 47.4	89 06 13.67	8 14 44
19	177 01 42.3	89 06 27.42	12 09 53	206 32 34.4	89 06 18.97	10 12 10	236 57 34.1	89 06 13.59	8 10 50
20	178 00 50.1	89 06 27.08	12 05 57	207 31 28.4	89 06 18.71	10 08 15	237 56 21.9	89 06 13.54	8 06 55
21	178 59 56.1	+89 06 26.74	12 02 02	208 30 21.6	+89 06 18.47	10 04 20	238 55 11.1	+89 06 13.50	8 03 00
22	179 59 00.7	89 06 26.40	11 58 06	209 29 14.5	89 06 18.25	10 00 25	239 54 01.7	89 06 13.46	7 59 06
23	180 58 04.1	89 06 26.08	11 54 11	210 28 08.0	89 06 18.06	9 56 30	240 52 53.2	89 06 13.40	7 55 11
24	181 57 06.7	89 06 25.78	11 50 15	211 27 02.4	89 06 17.89	9 52 35	241 51 45.0	89 06 13.33	7 51 16
25	182 56 09.3	89 06 25.50	11 46 20	212 25 58.0	89 06 17.72	9 48 40	242 50 36.1	89 06 13.25	7 47 21
26	183 55 12.3	+89 06 25.24	11 42 24	213 24 54.6	+89 06 17.54	9 44 45	243 49 26.0	+89 06 13.15	7 43 27
27	184 54 16.3	89 06 24.99	11 38 28	214 23 51.9	89 06 17.36	9 40 49	244 48 14.2	89 06 13.05	7 39 32
28	185 53 21.3	89 06 24.74	11 34 33	215 22 49.1	89 06 17.15	9 36 54	245 47 00.8	89 06 12.96	7 35 38
29	186 52 27.3	89 06 24.49	11 30 37	216 21 45.3	89 06 16.93	9 32 59	246 45 46.5	89 06 12.88	7 31 43
30	187 51 33.6	89 06 24.22	11 26 41	217 20 40.2	89 06 16.70	9 29 04	247 44 31.6	89 06 12.82	7 27 49
31				218 19 33.2	+89 06 16.46	9 25 09			

POLARIS, 1966

JULY

AUGUST

SEPTEMBER

DAY OF MONTH	GREENWICH			APPARENT			MEAN TIME			GREENWICH			APPARENT			MEAN TIME			GREENWICH			APPARENT			MEAN TIME			
	HOUR ANGLE			DECLINATION			GREENWICH			HOUR ANGLE			DECLINATION			GREENWICH			HOUR ANGLE			DECLINATION			GREENWICH			
	FOR 0 ^h UNIVERSAL TIME			FOR 0 ^h UNIVERSAL TIME			TRANSIT			FOR 0 ^h UNIVERSAL TIME			FOR 0 ^h UNIVERSAL TIME			TRANSIT			FOR 0 ^h UNIVERSAL TIME			FOR 0 ^h UNIVERSAL TIME			TRANSIT			
	°	'	"	°	'	"	h	m	s	°	'	"	°	'	"	h	m	s	°	'	"	°	'	"	h	m	s	
1	248	43	16.7	+89	06	12.79	7	23	54	279	05	34.1	+89	06	14.34	5	22	45	309	28	52.1	+89	06	20.58	3	21	32	
2	249	42	02.4	89	06	12.79	7	20	00	280	04	23.3	89	06	14.49	5	18	50	310	27	45.0	89	06	20.82	3	17	37	
3	250	40	49.2	89	06	12.79	7	16	06	281	03	13.1	89	06	14.63	5	14	56	311	26	37.2	89	06	21.05	3	13	42	
4	251	39	37.1	89	06	12.80	7	12	11	282	02	03.1	89	06	14.77	5	11	01	312	25	28.5	89	06	21.28	3	09	47	
5	252	38	25.9	89	06	12.82	7	08	16	283	00	52.9	89	06	14.90	5	07	06	313	24	19.0	89	06	21.52	3	05	52	
6	253	37	15.5	+89	06	12.82	7	04	22	283	59	42.1	+89	06	15.01	5	03	12	314	23	08.8	+89	06	21.78	3	01	58	
7	254	36	05.5	89	06	12.81	7	00	27	284	58	30.5	89	06	15.13	4	59	17	315	21	58.2	89	06	22.05	2	58	03	
8	255	34	55.3	89	06	12.80	6	56	32	285	57	17.9	89	06	15.24	4	55	23	316	20	47.5	89	06	22.34	2	54	08	
9	256	33	44.8	89	06	12.79	6	52	38	286	56	04.3	89	06	15.36	4	51	28	317	19	37.4	89	06	22.65	2	50	14	
10	257	32	33.6	89	06	12.76	6	48	43	287	54	49.7	89	06	15.50	4	47	34	318	18	28.4	89	06	22.99	2	46	19	
32	11	258	31	21.1	+89	06	12.73	6	44	48	288	53	34.8	+89	06	15.66	4	43	39	319	17	20.9	+89	06	23.35	2	42	24
	12	259	30	07.5	89	06	12.70	6	40	54	289	52	19.8	89	06	15.85	4	39	45	320	16	15.3	89	06	23.70	2	38	29
	13	260	28	52.8	89	06	12.69	6	37	00	290	51	05.5	89	06	16.07	4	35	51	321	15	11.1	89	06	24.05	2	34	34
	14	261	27	37.2	89	06	12.70	6	33	05	291	49	52.6	89	06	16.30	4	31	56	322	14	07.9	89	06	24.38	2	30	39
	15	262	26	21.1	89	06	12.74	6	29	11	292	48	41.3	89	06	16.55	4	28	01	323	13	04.3	89	06	24.68	2	26	44
	16	263	25	05.1	+89	06	12.79	6	25	17	293	47	31.6	+89	06	16.80	4	24	07	324	11	59.9	+89	06	24.97	2	22	49
17	264	23	50.0	89	06	12.88	6	21	22	294	46	23.1	89	06	17.03	4	20	12	325	10	53.8	89	06	25.25	2	18	54	
18	265	22	36.4	89	06	12.98	6	17	28	295	45	15.0	89	06	17.24	4	16	17	326	09	46.4	89	06	25.54	2	14	59	
19	266	21	24.4	89	06	13.09	6	13	33	296	44	06.2	89	06	17.43	4	12	22	327	08	37.9	89	06	25.84	2	11	04	
20	267	20	13.7	89	06	13.20	6	09	39	297	42	56.0	89	06	17.61	4	08	28	328	07	29.5	89	06	26.17	2	07	09	
21	268	19	03.7	+89	06	13.28	6	05	44	298	41	44.1	+89	06	17.79	4	04	33	329	06	21.9	+89	06	26.52	2	03	14	
22	269	17	53.5	89	06	13.35	6	01	49	299	40	31.2	89	06	17.99	4	00	39	330	05	15.4	89	06	26.89	1	59	19	
23	270	16	42.1	89	06	13.40	5	57	55	300	39	17.5	89	06	18.19	3	56	44	331	04	10.5	89	06	27.26	1	55	24	
24	271	15	29.3	89	06	13.44	5	54	00	301	38	04.1	89	06	18.43	3	52	50	332	03	07.0	89	06	27.63	1	51	29	
25	272	14	15.0	89	06	13.49	5	50	06	302	36	51.4	89	06	18.69	3	48	55	333	02	04.8	89	06	28.00	1	47	34	
26	273	12	59.7	+89	06	13.56	5	46	12	303	35	39.7	+89	06	18.96	3	45	01	334	01	03.6	+89	06	28.36	1	43	39	
27	274	11	43.7	89	06	13.65	5	42	17	304	34	29.3	89	06	19.24	3	41	06	335	00	02.9	89	06	28.72	1	39	43	
28	275	10	27.9	89	06	13.75	5	38	23	305	33	20.4	89	06	19.52	3	37	11	335	59	02.6	89	06	29.06	1	35	48	
29	276	09	12.8	89	06	13.89	5	34	29	306	32	12.6	89	06	19.80	3	33	16	336	58	02.0	89	06	29.38	1	31	53	
30	277	07	58.7	89	06	14.03	5	30	34	307	31	05.4	89	06	20.07	3	29	21	337	57	00.7	89	06	29.70	1	27	58	
31	278	06	45.8	+89	06	14.18	5	26	40	308	29	58.8	+89	06	20.33	3	25	26										

POLARIS, 1966

OCTOBER

NOVEMBER

DECEMBER

DAY OF MONTH	GREENWICH HOUR ANGLE FOR 0 ^h UNIVERSAL TIME			APPARENT DECLINATION FOR 0 ^h UNIVERSAL TIME			MEAN TIME GREENWICH TRANSIT			GREENWICH HOUR ANGLE FOR 0 ^h UNIVERSAL TIME			APPARENT DECLINATION FOR 0 ^h UNIVERSAL TIME			MEAN TIME GREENWICH TRANSIT			GREENWICH HOUR ANGLE FOR 0 ^h UNIVERSAL TIME			APPARENT DECLINATION FOR 0 ^h UNIVERSAL TIME			MEAN TIME GREENWICH TRANSIT		
	° ' "			° ' "			h m s			° ' "			° ' "			h m s			° ' "			° ' "			h m s		
	°	'	"	°	'	"	h	m	s	°	'	"	°	'	"	h	m	s	°	'	"	°	'	"	h	m	s
1	338	55	58.8	+89	06	30.01	1	24	02	9	26	13.6	+89	06	41.63	23	18	26	39	02	39.1	+89	06	52.63	21	20	18
2	339	54	55.9	89	06	30.33	1	20	07	10	25	18.7	89	06	42.03	23	14	30	40	01	57.5	89	06	53.00	21	16	22
3	340	53	52.5	89	06	30.65	1	16	12	11	24	25.1	89	06	42.44	23	10	34	41	01	17.9	89	06	53.36	21	12	25
4	341	52	48.6	89	06	30.99	1	12	17	12	23	32.8	89	06	42.87	23	06	38	42	00	39.6	89	06	53.71	21	08	28
5	342	51	44.8	89	06	31.35	1	08	22	13	22	42.4	89	06	43.30	23	02	42	43	00	02.1	89	06	54.04	21	04	31
6	343	50	41.4	+89	06	31.73	1	04	27	14	21	53.5	+89	06	43.72	22	58	46	43	59	24.6	+89	06	54.34	21	00	34
7	344	49	39.0	89	06	32.13	1	00	31	15	21	06.1	89	06	44.12	22	54	49	44	58	46.4	89	06	54.62	20	56	38
8	345	48	38.3	89	06	32.55	0	56	36	16	20	19.3	89	06	44.51	22	50	53	45	58	07.0	89	06	54.88	20	52	41
9	346	47	39.2	89	06	32.98	0	52	41	17	19	32.3	89	06	44.87	22	46	57	46	57	26.3	89	06	55.15	20	48	45
10	347	46	41.7	89	06	33.39	0	48	45	18	18	44.2	89	06	45.22	22	43	01	47	56	44.6	89	06	55.42	20	44	48
11	348	45	45.5	+89	06	33.78	0	44	50	19	17	55.0	+89	06	45.55	22	39	05	48	56	02.6	+89	06	55.70	20	40	51
12	349	44	49.7	89	06	34.16	0	40	54	20	17	04.4	89	06	45.89	22	35	09	49	55	21.2	89	06	56.00	20	36	55
13	350	43	53.1	89	06	34.51	0	36	58	21	16	13.1	89	06	46.24	22	31	13	50	54	40.8	89	06	56.32	20	32	58
14	351	42	55.5	89	06	34.85	0	33	03	22	15	22.0	89	06	46.61	22	27	17	51	54	02.1	89	06	56.64	20	29	01
15	352	41	56.2	89	06	35.19	0	29	07	23	14	31.7	89	06	47.01	22	23	21	52	53	25.2	89	06	56.96	20	25	04
16	353	40	55.8	+89	06	35.54	0	25	12	24	13	42.7	+89	06	47.42	22	19	25	53	52	49.8	+89	06	57.26	20	21	07
17	354	39	55.0	89	06	35.91	0	21	17	25	12	55.7	89	06	47.82	22	15	29	54	52	15.4	89	06	57.54	20	17	10
18	355	38	54.7	89	06	36.31	0	17	22	26	12	10.3	89	06	48.23	22	11	32	55	51	41.6	89	06	57.81	20	13	13
19	356	37	55.5	89	06	36.72	0	13	26	27	11	26.3	89	06	48.61	22	07	36	56	51	08.0	89	06	58.05	20	09	16
20	357	36	58.1	89	06	37.14	0	09	31	28	10	43.3	89	06	48.99	22	03	39	57	50	34.1	89	06	58.27	20	05	19
21	358	36	02.2	+89	06	37.56	0	05	35	29	10	00.8	+89	06	49.34	21	59	43	58	49	59.6	+89	06	58.47	20	01	22
22	359	35	07.9	89	06	37.98	0	01	39	30	09	18.2	89	06	49.68	21	55	46	59	49	24.3	89	06	58.67	19	57	25
23	0	34	14.5	89	06	38.38	23	57	43	31	08	35.5	89	06	50.00	21	51	50	60	48	48.1	89	06	58.86	19	53	28
24	1	33	22.2	89	06	38.77	23	53	48	32	07	52.2	89	06	50.31	21	47	53	61	48	11.0	89	06	59.06	19	49	31
25	2	32	30.3	89	06	39.15	23	49	52	33	07	08.1	89	06	50.61	21	43	57	62	47	33.7	89	06	59.27	19	45	34
26	3	31	38.1	+89	06	39.51	23	45	56	34	06	23.1	+89	06	50.92	21	40	01	63	46	56.3	+89	06	59.49	19	41	37
27	4	30	45.6	89	06	39.87	23	42	00	35	05	37.7	89	06	51.23	21	36	04	64	46	19.3	89	06	59.72	19	37	40
28	5	29	52.5	89	06	40.21	23	38	04	36	04	52.0	89	06	51.55	21	32	08	65	45	43.5	89	06	59.97	19	33	43
29	6	28	58.6	89	06	40.55	23	34	08	37	04	06.7	89	06	51.90	21	28	12	66	45	09.4	89	07	00.22	19	29	46
30	7	28	03.9	89	06	40.90	23	30	13	38	03	22.2	89	06	52.26	21	24	15	67	44	36.9	89	07	00.47	19	25	49
31	8	27	08.7	+89	06	41.26	23	26	17										68	44	05.9	+89	07	00.69	19	21	52

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE

Reduce the observed altitude of Polaris to the true altitude.

Take out the Greenwich Hour Angle and apparent declination of Polaris for the time of observation. Convert the GHA to time by the table on page 25.

Subtract west longitude, add east longitude; the result is the hour angle of Polaris.

With this hour angle as the vertical argument, and the apparent declination of Polaris as the horizontal argument, take out the correction from the main table and add it to or subtract it from the true altitude, according to its sign.

For altitudes other than 45° , corrections taken from the auxiliary table (page 38) may be applied when necessary for the degree of accuracy required.

Example.—August 5, 1966, at $11^h 40^m 30^s$ P.M. Eastern Standard Time (August 6, $4^h 40^m 30^s$ U.T.), in longitude $82^\circ (5^h 28^m)$ west of Greenwich, suppose the true altitude of Polaris to be $33^\circ 20' 00''$, required the latitude of the place.

G.H.A. of Polaris, page 32, Aug. 6 0^h U.T.

Aug. 7 0^h U.T.

283	59	42.1
284	58	30.5
360	58	48.4
$360^\circ 98015$		

Daily increase (360° plus tabular daily difference)

Conversion to decimals of a degree

$[.0167(48.4) = 0.808; .016667(58.808) = 0.98015]$

By table on page 26, $\frac{4^h 40^m 30^s}{24^h} = 0.194791; 0.194791 (360^\circ 98015)$

$70^\circ 31' 56.5''$

Conversion to degrees, minutes and seconds

$[60(0.31568) = 18.941; 60(0.941) = 56.5]$

G.H.A. of Polaris Aug. 6 0^h U.T.

Increase to $4^h 40^m 30^s$ U.T.

G.H.A. of Polaris at time of observation

283	59	42.1
70	18	56.5
354	18	38.6

Conversion to time, page 25

Longitude of observer

Hour angle of Polaris

Decl. of Polaris, page 32, for time of observation

23	37	15
5	28	
18	09	15

True altitude

Correction from main table, page 36

Correction from Auxiliary table, page 38

Latitude of the place

$+89^\circ$	$06'$	$15''$
$+33$	20	00
$-$	1	45
$-$		9
$+33$	18	06

Observations of Polaris for latitude should be made when practicable near times of upper or of lower culminations (hour angles 0^h or 12^h). However, at sea, if made near elongation (hour angle 6^h or 18^h), the hour angle, and hence the local time, should be known within one minute.

Decl. H.A.	$89^\circ 06' 10''$	$89^\circ 06' 20''$	$89^\circ 06' 30''$	$89^\circ 06' 40''$	$89^\circ 06' 50''$	$89^\circ 07' 00''$	Decl. H.A.
h m	$'$ $''$	$'$ $''$	$'$ $''$	$'$ $''$	$'$ $''$	$'$ $''$	h m
0 00	-53 50	-53 40	-53 30	-53 20	-53 10	-53 00	24 00
03	53 50	53 40	53 30	53 20	53 10	53 00	23 57
06	53 49	53 39	53 29	53 19	53 09	52 59	54
09	53 47	53 37	53 27	53 17	53 08	52 58	51
12	53 46	53 36	53 26	53 16	53 06	52 56	48
0 15	-53 43	-53 33	-53 23	-53 13	-53 03	-52 53	23 45
18	53 40	53 30	53 20	53 10	53 00	52 50	42
21	53 36	53 26	53 16	53 06	52 56	52 46	39
24	53 32	53 22	53 12	53 02	52 52	52 42	36
27	53 27	53 17	53 07	52 57	52 48	52 38	33
0 30	-53 22	-53 12	-53 02	-52 52	-52 42	-52 32	23 30
33	53 16	53 06	52 56	52 46	52 36	52 27	27
36	53 10	53 00	52 50	52 40	52 30	52 20	24
39	53 03	52 53	52 43	52 33	52 23	52 13	21
42	52 55	52 45	52 35	52 26	52 16	52 06	18
0 45	-52 47	-52 37	-52 27	-52 18	-52 08	-51 58	23 15
48	52 38	52 29	52 19	52 09	51 59	51 49	12
51	52 29	52 19	52 10	52 00	51 50	51 40	09
54	52 19	52 10	52 00	51 50	51 41	51 31	06
0 57	52 09	51 59	51 50	51 40	51 30	51 21	03
1 00	-51 58	-51 49	-51 39	-51 29	-51 20	-51 10	23 00
03	51 47	51 37	51 28	51 18	51 08	50 59	22 57
06	51 35	51 25	51 16	51 06	50 57	50 47	54
09	51 23	51 13	51 03	50 54	50 44	50 35	51
1 12	-51 10	-51 00	-50 51	-50 41	-50 32	-50 22	22 48

POLARIS, 1966

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FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE

Decl.		89°06'10"	89°06'20"	89°06'30"	89°06'40"	89°06'50"	89°07'00"	Decl.	
H.A.								H.A.	
h	m	' "	' "	' "	' "	' "	' "	h	m
1	12	-51 10	-51 00	-50 51	-50 41	-50 32	-50 22	22	48
	15	50 56	50 47	50 37	50 28	50 18	50 09		45
	18	50 42	50 33	50 23	50 14	50 04	49 55		42
	21	50 27	50 18	50 09	49 59	49 50	49 41		39
	24	50 12	50 03	49 54	49 44	49 35	49 26		36
1	27	-49 57	-49 47	-49 38	-49 29	-49 20	-49 10	22	33
	30	49 40	49 31	49 22	49 13	49 04	48 54		30
	33	49 24	49 15	49 05	48 56	48 47	48 38		27
	36	49 07	48 57	48 48	48 39	48 30	48 21		24
	39	48 49	48 40	48 31	48 22	48 13	48 04		21
1	42	-48 31	-48 22	-48 13	-48 04	-47 55	-47 46	22	18
	45	48 12	48 03	47 54	47 45	47 36	47 27		15
	48	47 53	47 44	47 35	47 26	47 17	47 08		12
	51	47 33	47 24	47 15	47 07	46 58	46 49		09
	54	47 13	47 04	46 55	46 47	46 38	46 29		06
1	57	-46 52	-46 43	-46 35	-46 26	-46 17	-46 09	22	03
	2 00	46 31	46 22	46 14	46 05	45 57	45 48		00
	03	46 09	46 01	45 52	45 44	45 35	45 27		57
	06	45 47	45 39	45 30	45 22	45 13	45 05		54
	09	45 25	45 16	45 08	44 59	44 51	44 42		51
2	12	-45 01	-44 53	-44 45	-44 36	-44 28	-44 20	21	48
	15	44 38	44 30	44 21	44 13	44 05	43 57		45
	18	44 14	44 06	43 57	43 49	43 41	43 33		42
	21	43 49	43 41	43 33	43 25	43 17	43 09		39
	24	43 24	43 16	43 08	43 00	42 52	42 44		36
2	27	-42 59	-42 51	-42 43	-42 35	-42 27	-42 19	21	33
	30	42 33	42 25	42 17	42 10	42 02	41 54		30
	33	42 07	41 59	41 51	41 44	41 36	41 28		27
	36	41 40	41 33	41 25	41 17	41 09	41 02		24
	39	41 13	41 05	40 58	40 50	40 43	40 35		21
2	42	-40 46	-40 38	-40 30	-40 23	-40 15	-40 08	21	18
	45	40 18	40 10	40 03	39 55	39 48	39 40		15
	48	39 49	39 42	39 34	39 27	39 20	39 12		12
	51	39 20	39 13	39 06	38 58	38 51	38 44		09
	54	38 51	38 44	38 37	38 30	38 22	38 15		06
2	57	-38 21	-38 14	-38 07	-38 00	-37 53	-37 46	21	03
	3 00	37 51	37 44	37 37	37 30	37 23	37 16		00
	03	37 21	37 14	37 07	37 00	36 53	36 46		57
	06	36 50	36 43	36 37	36 30	36 23	36 16		54
	09	36 19	36 12	36 06	35 59	35 52	35 45		51
3	12	-35 47	-35 41	-35 34	-35 28	-35 21	-35 14	20	48
	15	35 15	35 09	35 02	34 56	34 49	34 43		45
	18	34 43	34 37	34 30	34 24	34 18	34 11		42
	21	34 11	34 04	33 58	33 52	33 45	33 39		39
	24	33 38	33 31	33 25	33 19	33 13	33 07		36
3	27	-33 04	-32 58	-32 52	-32 46	-32 40	-32 34	20	33
	30	32 30	32 24	32 18	32 13	32 07	32 01		30
	33	31 56	31 51	31 45	31 39	31 33	31 27		27
	36	31 22	31 16	31 11	31 05	30 59	30 53		24
	39	30 47	30 42	30 36	30 30	30 25	30 19		21
3	42	-30 12	-30 07	-30 01	-29 56	-29 50	-29 45	20	18
	45	29 37	29 32	29 26	29 21	29 15	29 10		15
	48	29 01	28 56	28 51	28 45	28 40	28 35		12
	51	28 26	28 20	28 15	28 10	28 05	27 59		09
	54	27 49	27 44	27 39	27 34	27 29	27 24		06
3	57	-27 13	-27 08	-27 03	-26 58	-26 53	-26 48	20	03
	4 00	26 36	26 31	26 26	26 21	26 17	26 12		00
	03	25 59	25 54	25 50	25 45	25 40	25 35		57
	06	25 22	25 17	25 12	25 08	25 03	24 59		54
	4 09	-24 44	-24 40	-24 35	-24 31	-24 26	-24 22		19 51

POLARIS, 1966

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE

Decl.		89° 06' 10"		89° 06' 20"		89° 06' 30"		89° 06' 40"		89° 06' 50"		89° 07' 00"		Decl.	
H.A.														H.A.	
h	m	'	"	'	"	'	"	'	"	'	"	'	"	h	m
4	09	-24	44	-24	40	-24	35	-24	31	-24	26	-24	22	19	51
	12	24	06	24	02	23	58	23	53	23	49	23	44		48
	15	23	28	23	24	23	20	23	15	23	11	23	07		45
	18	22	50	22	46	22	42	22	37	22	33	22	29		42
	21	22	11	22	07	22	03	21	59	21	55	21	51		39
4	24	-21	33	-21	29	-21	25	-21	21	-21	17	-21	13	19	36
	27	20	54	20	50	20	46	20	42	20	38	20	35		33
	30	20	15	20	11	20	07	20	03	20	00	19	56		30
	33	19	35	19	32	19	28	19	24	19	21	19	17		27
	36	18	56	18	52	18	49	18	45	18	42	18	38		24
4	39	-18	16	-18	12	-18	09	-18	06	-18	02	-17	59	19	21
	42	17	36	17	33	17	29	17	26	17	23	17	20		18
	45	16	56	16	53	16	49	16	46	16	43	16	40		15
	48	16	15	16	12	16	09	16	06	16	04	16	01		12
	51	15	35	15	32	15	29	15	26	15	24	15	21		09
4	54	-14	54	-14	51	-14	49	-14	46	-14	43	-14	41	19	06
4	57	14	13	14	11	14	08	14	06	14	03	14	01		03
5	00	13	32	13	30	13	28	13	25	13	23	13	20	19	00
	03	12	51	12	49	12	47	12	44	12	42	12	40	18	57
	06	12	10	12	08	12	06	12	04	12	01	11	59		54
5	09	-11	29	-11	27	-11	25	-11	23	-11	21	-11	19	18	51
	12	10	47	10	45	10	44	10	42	10	40	10	38		48
	15	10	06	10	04	10	02	10	00	9	59	9	57		45
	18	9	24	9	23	9	21	9	19	9	18	9	16		42
	21	8	42	8	41	8	39	8	38	8	36	8	35		39
5	24	- 8	01	- 7	59	- 7	58	- 7	56	- 7	55	- 7	54	18	36
	27	7	19	7	17	7	16	7	15	7	14	7	12		33
	30	6	37	6	36	6	34	6	33	6	32	6	31		30
	33	5	55	5	54	5	53	5	52	5	51	5	50		27
	36	5	13	5	12	5	11	5	10	5	09	5	08		24
5	39	- 4	30	- 4	30	- 4	29	- 4	28	- 4	27	- 4	27	18	21
	42	3	48	3	48	3	47	3	46	3	46	3	45		18
	45	3	06	3	06	3	05	3	05	3	04	3	04		15
	48	2	24	2	23	2	23	2	23	2	22	2	22		12
	51	1	42	1	41	1	41	1	41	1	41	1	40		09
5	54	- 0	59	- 0	59	- 0	59	- 0	59	- 0	59	- 0	59	18	06
5	57	- 0	17	- 0	17	- 0	17	- 0	17	- 0	17	- 0	17		03
6	00	+ 0	25	+ 0	25	+ 0	25	+ 0	25	+ 0	25	+ 0	25	18	00
	03	1	08	1	07	1	07	1	07	1	06	1	06		57
	06	1	50	1	49	1	49	1	49	1	48	1	48		54
6	09	+ 2	32	+ 2	32	+ 2	31	+ 2	30	+ 2	30	+ 2	29	17	51
	12	3	14	3	14	3	13	3	12	3	12	3	11		48
	15	3	56	3	56	3	55	3	54	3	53	3	52		45
	18	4	39	4	38	4	37	4	36	4	35	4	34		42
	21	5	21	5	20	5	19	5	17	5	16	5	15		39
6	24	+ 6	03	+ 6	01	+ 6	00	+ 5	59	+ 5	58	+ 5	57	17	36
	27	6	45	6	43	6	42	6	41	6	39	6	38		33
	30	7	27	7	25	7	24	7	22	7	21	7	19		30
	33	8	08	8	07	8	05	8	04	8	02	8	00		27
	36	8	50	8	48	8	47	8	45	8	43	8	41		24
6	39	+ 9	32	+ 9	30	+ 9	28	+ 9	26	+ 9	24	+ 9	22	17	21
	42	10	13	10	11	10	09	10	07	10	05	10	03		18
	45	10	55	10	52	10	50	10	48	10	46	10	44		15
	48	11	36	11	34	11	31	11	29	11	27	11	25		12
	51	12	17	12	15	12	12	12	10	12	08	12	05		09
6	54	+12	58	+12	56	+12	53	+12	51	+12	48	+12	46	17	06
6	57	13	39	13	36	13	34	13	31	13	28	13	26		03
7	00	14	20	14	17	14	14	14	11	14	09	14	06	17	00
	03	15	00	14	57	14	55	14	52	14	49	14	46		57
7	06	+15	41	+15	38	+15	35	+15	32	+15	29	+15	26	16	54

Decl. /
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FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE

Decl. H.A.		89°06'10"	89°06'20"	89°06'30"	89°06'40"	89°06'50"	89°07'00"	Decl. H.A.	
h	m	' "	' "	' "	' "	' "	' "	h	m
7	06	+15 41	+15 38	+15 35	+15 32	+15 29	+15 26	16	54
	09	16 21	16 18	16 15	16 12	16 09	16 05		51
	12	17 01	16 58	16 55	16 51	16 48	16 45		48
	15	17 41	17 38	17 34	17 31	17 28	17 24		45
	18	18 21	18 17	18 14	18 10	18 07	18 03		42
7	21	+19 00	+18 57	+18 53	+18 50	+18 46	+18 42	16	39
	24	19 40	19 36	19 32	19 29	19 25	19 21		36
	27	20 19	20 15	20 11	20 07	20 03	20 00		33
	30	20 58	20 54	20 50	20 46	20 42	20 38		30
	33	21 36	21 32	21 28	21 24	21 20	21 16		27
7	36	+22 15	+22 11	+22 07	+22 02	+21 58	+21 54	16	24
	39	22 53	22 49	22 45	22 40	22 36	22 32		21
	42	23 31	23 27	23 22	23 18	23 14	23 09		18
	45	24 09	24 04	24 00	23 55	23 51	23 46		15
	48	24 47	24 42	24 37	24 33	24 28	24 23		12
7	51	+25 24	+25 19	+25 14	+25 10	+25 05	+25 00	16	09
	54	26 01	25 56	25 51	25 46	25 41	25 36		06
	57	26 38	26 33	26 28	26 23	26 18	26 13		03
8	00	27 14	27 09	27 04	26 59	26 54	26 48	16	00
	03	27 50	27 45	27 40	27 35	27 29	27 24	15	57
8	06	+28 26	+28 21	+28 15	+28 10	+28 05	+27 59	15	54
	09	29 02	28 56	28 51	28 45	28 40	28 35		51
	12	29 37	29 32	29 26	29 20	29 15	29 09		48
	15	30 12	30 06	30 01	29 55	29 49	29 44		45
	18	30 47	30 41	30 35	30 29	30 24	30 18		42
8	21	+31 21	+31 15	+31 09	+31 04	+30 58	+30 52	15	39
	24	31 55	31 49	31 43	31 37	31 31	31 25		36
	27	32 29	32 23	32 17	32 11	32 05	31 59		33
	30	33 02	32 56	32 50	32 44	32 38	32 31		30
	33	33 35	33 29	33 23	33 17	33 10	33 04		27
8	36	+34 08	+34 02	+33 55	+33 49	+33 43	+33 36	15	24
	39	34 40	34 34	34 27	34 21	34 14	34 08		21
	42	35 12	35 06	34 59	34 53	34 46	34 40		18
	45	35 44	35 37	35 31	35 24	35 17	35 11		15
	48	36 15	36 09	36 02	35 55	35 48	35 41		12
8	51	+36 46	+36 39	+36 33	+36 26	+36 19	+36 12	15	09
	54	37 17	37 10	37 03	36 56	36 49	36 42		06
	57	37 47	37 40	37 33	37 26	37 19	37 12		03
9	00	38 17	38 10	38 02	37 55	37 48	37 41	15	00
	03	38 46	38 39	38 32	38 24	38 17	38 10	14	57
9	06	+39 15	+39 08	+39 00	+38 53	+38 46	+38 38	14	54
	09	39 44	39 36	39 29	39 21	39 14	39 07		51
	12	40 12	40 04	39 57	39 49	39 42	39 34		48
	15	40 40	40 32	40 24	40 17	40 09	40 02		45
	18	41 07	40 59	40 52	40 44	40 36	40 29		42
9	21	+41 34	+41 26	+41 18	+41 11	+41 03	+40 55	14	39
	24	42 00	41 52	41 45	41 37	41 29	41 21		36
	27	42 26	42 18	42 11	42 03	41 55	41 47		33
	30	42 52	42 44	42 36	42 28	42 20	42 12		30
	33	43 17	43 09	43 01	42 53	42 45	42 37		27
9	36	+43 42	+43 34	+43 26	+43 18	+43 09	+43 01	14	24
	39	44 06	43 58	43 50	43 42	43 33	43 25		21
	42	44 30	44 22	44 14	44 05	43 57	43 49		18
	45	44 54	44 45	44 37	44 28	44 20	44 12		15
	48	45 16	45 08	45 00	44 51	44 43	44 34		12
9	51	+45 39	+45 30	+45 22	+45 13	+45 05	+44 56	14	09
	54	46 01	45 52	45 44	45 35	45 27	45 18		06
	57	46 23	46 14	46 05	45 57	45 48	45 39		03
10	00	46 44	46 35	46 26	46 18	46 09	46 00	14	00
	03	+47 04	+46 55	+46 47	+46 38	+46 29	+46 20	13	57

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Decl. H.A.		89°06'10"	89°06'20"	89°06'30"	89°06'40"	89°06'50"	89°07'00"	Decl. H.A.	
h m								h m	
10	03	+47 04	+46 55	+46 47	+46 38	+46 29	+46 20	13	57
	06	47 24	47 16	47 07	46 58	46 49	46 40		54
	09	47 44	47 35	47 26	47 17	47 09	47 00		51
	12	48 03	47 54	47 45	47 36	47 27	47 19		48
	15	48 22	48 13	48 04	47 55	47 46	47 37		45
10	18	+48 40	+48 31	+48 22	+48 13	+48 04	+47 55	13	42
	21	48 58	48 49	48 40	48 30	48 21	48 12		39
	24	49 15	49 06	48 57	48 47	48 38	48 29		36
	27	49 32	49 22	49 13	49 04	48 55	48 46		33
	30	49 48	49 39	49 29	49 20	49 11	49 02		30
10	33	+50 04	+49 54	+49 45	+49 36	+49 26	+49 17	13	27
	36	50 19	50 09	50 00	49 51	49 41	49 32		24
	39	50 33	50 24	50 15	50 05	49 56	49 46		21
	42	50 48	50 38	50 29	50 19	50 10	50 00		18
	45	51 01	50 52	50 42	50 33	50 23	50 14		15
10	48	+51 14	+51 05	+50 55	+50 46	+50 36	+50 27	13	12
	51	51 27	51 17	51 08	50 58	50 49	50 39		09
	54	51 39	51 29	51 20	51 10	51 01	50 51		06
	57	51 51	51 41	51 31	51 22	51 12	51 02		03
11	00	52 02	51 52	51 42	51 33	51 23	51 13	13	00
11	03	+52 12	+52 02	+51 53	+51 43	+51 33	+51 24	12	57
	06	52 22	52 12	52 03	51 53	51 43	51 33		54
	09	52 32	52 22	52 12	52 02	51 53	51 43		51
	12	52 41	52 31	52 21	52 11	52 01	51 52		48
	15	52 49	52 39	52 29	52 19	52 10	52 00		45
11	18	+52 57	+52 47	+52 37	+52 27	+52 17	+52 08	12	42
	21	53 04	52 54	52 44	52 34	52 25	52 15		39
	24	53 11	53 01	52 51	52 41	52 31	52 21		36
	27	53 17	53 07	52 57	52 47	52 38	52 28		33
	30	53 23	53 13	53 03	52 53	52 43	52 33		30
11	33	+53 28	+53 18	+53 08	+52 58	+52 48	+52 38	12	27
	36	53 33	53 23	53 13	53 03	52 53	52 43		24
	39	53 37	53 27	53 17	53 07	52 57	52 47		21
	42	53 40	53 30	53 20	53 10	53 00	52 50		18
	45	53 43	53 33	53 23	53 13	53 03	52 53		15
11	48	+53 46	+53 36	+53 26	+53 16	+53 06	+52 56	12	12
	51	53 48	53 38	53 28	53 18	53 08	52 58		09
	54	53 49	53 39	53 29	53 19	53 09	52 59		06
	57	53 50	53 40	53 30	53 20	53 10	53 00		03
12	00	+53 50	+53 40	+53 30	+53 20	+53 10	+53 00	12	00

AUXILIARY TABLE

The main table has been computed for an altitude of 45°. For other altitudes, corrections taken from the table below may be applied when the desired degree of accuracy requires it.

Altitude H.A.		10°	20°	30°	40°	50°	60°	70°	Altitude H.A.	
h h									h h	
0	12	0	0	0	0	0	0	0	12	24
1	11	- 1	- 1	- 1	0	0	+ 1	+ 3	13	23
2	10	5	4	3	-1	+1	5	11	14	22
3	9	10	8	5	2	2	9	22	15	21
4	8	15	12	8	3	4	14	33	16	20
5	7	19	15	10	4	4	17	41	17	19
6	6	-21	-16	-11	-4	+5	+18	+44	18	18

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AZIMUTH AT ALL HOUR ANGLES

[For hour angles 0^h to 12^h Polaris is west of north, and for hour angles 12^h to 24^h it is east of north]

Lat.		10°	15°	20°	22°	24°	26°	28°	30°	32°	Lat.		
H.A.												H.A.	
h	m	°	'	°	'	°	'	°	'	°	'	h	m
0	00	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	24	00
	10	0 02.4	0 02.4	0 02.5	0 02.5	0 02.6	0 02.6	0 02.7	0 02.7	0 02.8	0 02.8	23	50
	20	0 04.7	0 04.8	0 05.0	0 05.0	0 05.1	0 05.2	0 05.3	0 05.4	0 05.5	0 05.5		40
	30	0 07.1	0 07.2	0 07.4	0 07.4	0 07.7	0 07.8	0 07.9	0 08.1	0 08.3	0 08.3		30
	40	0 09.4	0 09.6	0 09.9	0 10.1	0 10.2	0 10.4	0 10.6	0 10.8	0 11.0	0 11.0		20
	50	0 11.7	0 12.0	0 12.3	0 12.5	0 12.7	0 12.9	0 13.2	0 13.4	0 13.7	0 13.7		10
1	00	0 14.1	0 14.3	0 14.8	0 15.0	0 15.2	0 15.5	0 15.8	0 16.1	0 16.4	0 16.4	23	00
	10	0 16.3	0 16.7	0 17.2	0 17.4	0 17.7	0 18.0	0 18.3	0 18.7	0 19.1	0 19.1	22	50
	20	0 18.6	0 19.0	0 19.5	0 19.8	0 20.1	0 20.4	0 20.8	0 21.2	0 21.7	0 21.7		40
	30	0 20.8	0 21.2	0 21.8	0 22.1	0 22.5	0 22.9	0 23.3	0 23.8	0 24.3	0 24.3		30
	40	0 22.9	0 23.4	0 24.1	0 24.5	0 24.8	0 25.2	0 25.7	0 26.2	0 26.8	0 26.8		20
	50	0 25.1	0 25.6	0 26.3	0 26.7	0 27.1	0 27.6	0 28.1	0 28.7	0 29.3	0 29.3		10
2	00	0 27.1	0 27.7	0 28.5	0 28.9	0 29.4	0 29.9	0 30.4	0 31.0	0 31.7	0 31.7	22	00
	10	0 29.2	0 29.8	0 30.6	0 31.1	0 31.5	0 32.1	0 32.7	0 33.3	0 34.1	0 34.1	21	50
	20	0 31.1	0 31.8	0 32.7	0 33.2	0 33.7	0 34.2	0 34.9	0 35.6	0 36.4	0 36.4		40
	30	0 33.0	0 33.7	0 34.7	0 35.2	0 35.7	0 36.3	0 37.0	0 37.8	0 38.6	0 38.6		30
	40	0 34.9	0 35.6	0 36.6	0 37.2	0 37.7	0 38.4	0 39.1	0 39.9	0 40.7	0 40.7		20
	50	0 36.7	0 37.4	0 38.5	0 39.0	0 39.6	0 40.3	0 41.1	0 41.9	0 42.8	0 42.8		10
3	00	0 38.4	0 39.2	0 40.3	0 40.9	0 41.5	0 42.2	0 43.0	0 43.8	0 44.8	0 44.8	21	00
	10	0 40.0	0 40.8	0 42.0	0 42.6	0 43.2	0 44.0	0 44.8	0 45.7	0 46.7	0 46.7	20	50
	20	0 41.6	0 42.4	0 43.6	0 44.2	0 44.9	0 45.7	0 46.5	0 47.4	0 48.5	0 48.5		40
	30	0 43.0	0 43.9	0 45.2	0 45.8	0 46.5	0 47.3	0 48.2	0 49.1	0 50.2	0 50.2		30
	40	0 44.4	0 45.3	0 46.6	0 47.3	0 48.0	0 48.8	0 49.7	0 50.7	0 51.8	0 51.8		20
	50	0 45.7	0 46.7	0 48.0	0 48.7	0 49.4	0 50.3	0 51.2	0 52.2	0 53.3	0 53.3		10
4	00	0 47.0	0 47.9	0 49.3	0 50.0	0 50.7	0 51.6	0 52.5	0 53.6	0 54.7	0 54.7	20	00
	10	0 48.1	0 49.1	0 50.5	0 51.2	0 51.9	0 52.8	0 53.8	0 54.9	0 56.0	0 56.0	19	50
	20	0 49.1	0 50.1	0 51.6	0 52.3	0 53.1	0 53.9	0 54.9	0 56.0	0 57.2	0 57.2		40
	30	0 50.1	0 51.1	0 52.5	0 53.3	0 54.1	0 55.0	0 56.0	0 57.1	0 58.3	0 58.3		30
	40	0 50.9	0 52.0	0 53.4	0 54.2	0 55.0	0 55.9	0 56.9	0 58.0	0 59.3	0 59.3		20
	50	0 51.7	0 52.7	0 54.2	0 55.0	0 55.8	0 56.7	0 57.8	0 58.9	1 00.2	1 00.2		10
5	00	0 52.3	0 53.4	0 54.9	0 55.7	0 56.5	0 57.4	0 58.5	0 59.6	1 00.9	1 00.9	19	00
	10	0 52.9	0 54.0	0 55.5	0 56.2	0 57.1	0 58.0	0 59.1	1 00.2	1 01.5	1 01.5	18	50
	20	0 53.4	0 54.4	0 55.9	0 56.7	0 57.6	0 58.5	0 59.6	1 00.7	1 02.0	1 02.0		40
	30	0 53.7	0 54.8	0 56.3	0 57.1	0 57.9	0 58.9	0 59.9	1 01.1	1 02.4	1 02.4		30
	40	0 54.0	0 55.0	0 56.6	0 57.3	0 58.2	0 59.1	1 00.2	1 01.4	1 02.7	1 02.7		20
	50	0 54.1	0 55.2	0 56.7	0 57.5	0 58.3	0 59.3	1 00.4	1 01.5	1 02.9	1 02.9		10
6	00	0 54.2	0 55.2	0 56.8	0 57.5	0 58.4	0 59.3	1 00.4	1 01.6	1 02.9	1 02.9	18	00
	10	0 54.1	0 55.1	0 56.7	0 57.5	0 58.3	0 59.3	1 00.3	1 01.5	1 02.8	1 02.8	17	50
	20	0 53.9	0 55.0	0 56.5	0 57.3	0 58.1	0 59.1	1 00.1	1 01.3	1 02.6	1 02.6		40
	30	0 53.7	0 54.7	0 56.2	0 57.0	0 57.8	0 58.8	0 59.8	1 01.0	1 02.3	1 02.3		30
	40	0 53.3	0 54.3	0 55.8	0 56.6	0 57.4	0 58.4	0 59.4	1 00.6	1 01.8	1 01.8		20
	50	0 52.8	0 53.9	0 55.3	0 56.1	0 56.9	0 57.8	0 58.9	1 00.0	1 01.3	1 01.3		10
7	00	0 52.3	0 53.3	0 54.7	0 55.5	0 56.3	0 57.2	0 58.2	0 59.3	1 00.6	1 00.6	17	00
	10	0 51.6	0 52.6	0 54.0	0 54.8	0 55.6	0 56.5	0 57.5	0 58.6	0 59.8	0 59.8	16	50
	20	0 50.8	0 51.8	0 53.2	0 53.9	0 54.7	0 55.6	0 56.6	0 57.7	0 58.9	0 58.9		40
	30	0 50.0	0 50.9	0 52.3	0 53.0	0 53.8	0 54.7	0 55.6	0 56.7	0 57.9	0 57.9		30
	40	0 49.0	0 50.0	0 51.3	0 52.0	0 52.8	0 53.6	0 54.6	0 55.6	0 56.8	0 56.8		20
	50	0 48.0	0 48.9	0 50.2	0 50.9	0 51.6	0 52.4	0 53.4	0 54.4	0 55.5	0 55.5		10
8	00	0 46.8	0 47.7	0 49.0	0 49.7	0 50.4	0 51.2	0 52.1	0 53.1	0 54.2	0 54.2	16	00
	10	0 45.6	0 46.5	0 47.7	0 48.3	0 49.1	0 49.8	0 50.7	0 51.7	0 52.8	0 52.8	15	50
	20	0 44.3	0 45.1	0 46.3	0 47.0	0 47.6	0 48.4	0 49.2	0 50.2	0 51.2	0 51.2		40
	30	0 42.9	0 43.7	0 44.9	0 45.5	0 46.1	0 46.9	0 47.7	0 48.6	0 49.6	0 49.6		30
	40	0 41.4	0 42.2	0 43.3	0 43.9	0 44.5	0 45.2	0 46.0	0 46.9	0 47.9	0 47.9		20
	50	0 39.9	0 40.6	0 41.7	0 42.2	0 42.8	0 43.5	0 44.3	0 45.1	0 46.1	0 46.1		10
9	00	0 38.2	0 38.9	0 40.0	0 40.5	0 41.1	0 41.7	0 42.5	0 43.3	0 44.2	0 44.2	15	00

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AZIMUTH AT ALL HOUR ANGLES

[For hour angles 0^h to 12^h Polaris is west of north, and for hour angles 12^h to 24^h it is east of north]

Lat.		10°	15°	20°	22°	24°	26°	28°	30°	32°	Lat.		
H.A.											H.A.		
h	m	°	'	°	'	°	'	°	'	°	'	h	m
9	00	0 38.2	0 38.9	0 40.0	0 40.5	0 41.1	0 41.7	0 42.5	0 43.3	0 44.2		15	00
	10	0 36.5	0 37.2	0 38.2	0 38.7	0 39.2	0 39.9	0 40.6	0 41.3	0 42.2		14	50
	20	0 34.7	0 35.4	0 36.3	0 36.8	0 37.3	0 37.9	0 38.6	0 39.3	0 40.1			40
	30	0 32.9	0 33.5	0 34.4	0 34.8	0 35.3	0 35.9	0 36.5	0 37.2	0 38.0			30
	40	0 31.0	0 31.6	0 32.4	0 32.8	0 33.3	0 33.8	0 34.4	0 35.1	0 35.8			20
	50	0 29.0	0 29.6	0 30.3	0 30.7	0 31.2	0 31.7	0 32.2	0 32.8	0 33.5			10
10	00	0 27.0	0 27.5	0 28.2	0 28.6	0 29.0	0 29.5	0 30.0	0 30.6	0 31.2		14	00
	10	0 24.9	0 25.4	0 26.1	0 26.4	0 26.8	0 27.2	0 27.7	0 28.2	0 28.8		13	50
	20	0 22.8	0 23.2	0 23.9	0 24.2	0 24.5	0 24.9	0 25.3	0 25.8	0 26.3			40
	30	0 20.7	0 21.0	0 21.6	0 21.9	0 22.2	0 22.5	0 22.9	0 23.4	0 23.9			30
	40	0 18.5	0 18.8	0 19.3	0 19.6	0 19.8	0 20.1	0 20.5	0 20.9	0 21.3			20
	50	0 16.2	0 16.5	0 17.0	0 17.2	0 17.4	0 17.7	0 18.0	0 18.4	0 18.7			10
11	00	0 14.0	0 14.2	0 14.6	0 14.8	0 15.0	0 15.2	0 15.5	0 15.8	0 16.1		13	00
	10	0 11.7	0 11.9	0 12.2	0 12.4	0 12.6	0 12.8	0 13.0	0 13.2	0 13.5		12	50
	20	0 09.4	0 09.5	0 09.8	0 09.9	0 10.1	0 10.2	0 10.4	0 10.6	0 10.8			40
	30	0 07.1	0 07.2	0 07.4	0 07.5	0 07.6	0 07.7	0 07.8	0 08.0	0 08.1			30
	40	0 04.7	0 04.8	0 04.9	0 05.0	0 05.1	0 05.1	0 05.2	0 05.3	0 05.4			20
	50	0 02.4	0 02.4	0 02.5	0 02.5	0 02.5	0 02.6	0 02.6	0 02.7	0 02.7			10
12	00	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0		12	00
Lat.		32°	34°	36°	38°	40°	42°	44°	46°	48°	Lat.		
H.A.											H.A.		
h	m	°	'	°	'	°	'	°	'	°	'	h	m
0	00	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0		24	00
	10	0 02.8	0 02.8	0 02.9	0 03.0	0 03.1	0 03.2	0 03.3	0 03.4	0 03.5		23	50
	20	0 05.5	0 05.7	0 05.8	0 06.0	0 06.1	0 06.3	0 06.6	0 06.8	0 07.1			40
	30	0 08.3	0 08.5	0 08.7	0 08.9	0 09.2	0 09.5	0 09.8	0 10.2	0 10.6			30
	40	0 11.0	0 11.3	0 11.6	0 11.9	0 12.2	0 12.6	0 13.1	0 13.5	0 14.1			20
	50	0 13.7	0 14.1	0 14.4	0 14.8	0 15.3	0 15.7	0 16.3	0 16.9	0 17.5			10
1	00	0 16.4	0 16.8	0 17.3	0 17.7	0 18.2	0 18.8	0 19.5	0 20.2	0 21.0		23	00
	10	0 19.1	0 19.5	0 20.0	0 20.6	0 21.2	0 21.9	0 22.6	0 23.4	0 24.4		22	50
	20	0 21.7	0 22.2	0 22.8	0 23.4	0 24.1	0 24.9	0 25.7	0 26.7	0 27.7			40
	30	0 24.3	0 24.9	0 25.5	0 26.2	0 27.0	0 27.8	0 28.8	0 29.8	0 31.0			30
	40	0 26.8	0 27.4	0 28.1	0 28.9	0 29.8	0 30.7	0 31.8	0 32.9	0 34.2			20
	50	0 29.3	0 30.0	0 30.7	0 31.6	0 32.5	0 33.6	0 34.7	0 36.0	0 37.4			10
2	00	0 31.7	0 32.5	0 33.3	0 34.2	0 35.2	0 36.3	0 37.6	0 38.9	0 40.5		22	00
	10	0 34.1	0 34.9	0 35.8	0 36.7	0 37.8	0 39.0	0 40.3	0 41.8	0 43.5		21	50
	20	0 36.4	0 37.2	0 38.2	0 39.2	0 40.4	0 41.6	0 43.1	0 44.6	0 46.4			40
	30	0 38.6	0 39.5	0 40.5	0 41.6	0 42.8	0 44.2	0 45.7	0 47.3	0 49.2			30
	40	0 40.7	0 41.7	0 42.7	0 43.9	0 45.2	0 46.6	0 48.2	0 50.0	0 51.9			20
	50	0 42.8	0 43.8	0 44.9	0 46.1	0 47.5	0 49.0	0 50.6	0 52.5	0 54.5			10
3	00	0 44.8	0 45.8	0 47.0	0 48.3	0 49.7	0 51.3	0 53.0	0 54.9	0 57.1		21	00
	10	0 46.7	0 47.8	0 49.0	0 50.3	0 51.8	0 53.4	0 55.2	0 57.2	0 59.5		20	50
	20	0 48.5	0 49.6	0 50.9	0 52.2	0 53.8	0 55.5	0 57.3	0 59.4	1 01.7			40
	30	0 50.2	0 51.4	0 52.7	0 54.1	0 55.7	0 57.4	0 59.4	1 01.5	1 03.9			30
	40	0 51.8	0 53.0	0 54.3	0 55.8	0 57.5	0 59.3	1 01.3	1 03.5	1 05.9			20
	50	0 53.3	0 54.6	0 55.9	0 57.5	0 59.1	1 01.0	1 03.0	1 05.3	1 07.8			10
4	00	0 54.7	0 56.0	0 57.4	0 59.0	1 00.7	1 02.6	1 04.7	1 07.0	1 09.6		20	00
	10	0 56.0	0 57.3	0 58.8	1 00.4	1 02.1	1 04.1	1 06.2	1 08.6	1 11.3		19	50
	20	0 57.2	0 58.6	1 00.0	1 01.7	1 03.4	1 05.4	1 07.6	1 10.1	1 12.8			40
	30	0 58.3	0 59.7	1 01.2	1 02.8	1 04.6	1 06.7	1 08.9	1 11.4	1 14.1			30
	40	0 59.3	1 00.7	1 02.2	1 03.9	1 05.7	1 07.8	1 10.0	1 12.5	1 15.3			20
	50	1 00.2	1 01.5	1 03.1	1 04.8	1 06.7	1 08.7	1 11.0	1 13.6	1 16.4			10
5	00	1 00.9	1 02.3	1 03.9	1 05.6	1 07.5	1 09.6	1 11.9	1 14.5	1 17.3		19	00

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AZIMUTH AT ALL HOUR ANGLES

[For hour angles 0^h to 12^h Polaris is west of north, and for hour angles 12^h to 24^h it is east of north]

Lat.											Lat.		
H.A.		32°	34°	36°	38°	40°	42°	44°	46°	48°	H.A.		
h	m	°	'	°	'	°	'	°	'	°	'	h	m
5	00	1 00.9	1 02.3	1 03.9	1 05.6	1 07.5	1 09.6	1 11.9	1 14.5	1 17.3		19	00
	10	1 01.5	1 02.9	1 04.5	1 06.2	1 08.2	1 10.3	1 12.6	1 15.2	1 18.1		18	50
	20	1 02.0	1 03.5	1 05.0	1 06.8	1 08.7	1 10.8	1 13.2	1 15.8	1 18.7			40
	30	1 02.4	1 03.9	1 05.4	1 07.2	1 09.1	1 11.3	1 13.6	1 16.3	1 19.2			30
	40	1 02.7	1 04.1	1 05.7	1 07.5	1 09.4	1 11.6	1 14.0	1 16.6	1 19.5			20
	50	1 02.9	1 04.3	1 05.9	1 07.6	1 09.6	1 11.7	1 14.1	1 16.7	1 19.7			10
6	00	1 02.9	1 04.3	1 05.9	1 07.7	1 09.6	1 11.8	1 14.1	1 16.8	1 19.7		18	00
	10	1 02.8	1 04.2	1 05.8	1 07.6	1 09.5	1 11.6	1 14.0	1 16.6	1 19.6		17	50
	20	1 02.6	1 04.0	1 05.6	1 07.3	1 09.3	1 11.4	1 13.8	1 16.4	1 19.3			40
	30	1 02.3	1 03.7	1 05.3	1 07.0	1 08.9	1 11.0	1 13.4	1 15.9	1 18.8			30
	40	1 01.8	1 03.2	1 04.8	1 06.5	1 08.4	1 10.5	1 12.8	1 15.4	1 18.3			20
	50	1 01.3	1 02.7	1 04.2	1 05.9	1 07.8	1 09.8	1 12.1	1 14.7	1 17.5			10
7	00	1 00.6	1 02.0	1 03.5	1 05.2	1 07.0	1 09.1	1 11.3	1 13.8	1 16.6		17	00
	10	0 59.8	1 01.2	1 02.7	1 04.3	1 06.1	1 08.2	1 10.4	1 12.9	1 15.6		16	50
	20	0 58.9	1 00.2	1 01.7	1 03.3	1 05.1	1 07.1	1 09.3	1 11.7	1 14.5			40
	30	0 57.9	0 59.2	1 00.6	1 02.2	1 04.0	1 05.9	1 08.1	1 10.5	1 13.1			30
	40	0 56.8	0 58.0	0 59.5	1 01.0	1 02.7	1 04.7	1 06.8	1 09.1	1 11.7			20
	50	0 55.5	0 56.8	0 58.2	0 59.7	1 01.4	1 03.2	1 05.3	1 07.6	1 10.1			10
8	00	0 54.2	0 55.4	0 56.8	0 58.3	0 59.9	1 01.7	1 03.7	1 06.0	1 08.4		16	00
	10	0 52.8	0 54.0	0 55.3	0 56.7	0 58.3	1 00.1	1 02.0	1 04.2	1 06.6		15	50
	20	0 51.2	0 52.4	0 53.7	0 55.1	0 56.6	0 58.3	1 00.2	1 02.3	1 04.6			40
	30	0 49.6	0 50.7	0 51.9	0 53.3	0 54.8	0 56.5	0 58.3	1 00.3	1 02.6			30
	40	0 47.9	0 48.9	0 50.1	0 51.4	0 52.9	0 54.5	0 56.3	0 58.2	1 00.4			20
	50	0 46.1	0 47.1	0 48.2	0 49.5	0 50.9	0 52.4	0 54.1	0 56.0	0 58.1			10
9	00	0 44.2	0 45.2	0 46.2	0 47.4	0 48.8	0 50.3	0 51.9	0 53.7	0 55.7		15	00
	10	0 42.2	0 43.1	0 44.2	0 45.3	0 46.6	0 48.0	0 49.5	0 51.3	0 53.2		14	50
	20	0 40.1	0 41.0	0 42.0	0 43.1	0 44.3	0 45.6	0 47.1	0 48.8	0 50.6			40
	30	0 38.0	0 38.8	0 39.8	0 40.8	0 41.9	0 43.2	0 44.6	0 46.1	0 47.9			30
	40	0 35.8	0 36.6	0 37.5	0 38.4	0 39.5	0 40.7	0 42.0	0 43.5	0 45.1			20
	50	0 33.5	0 34.3	0 35.1	0 36.0	0 37.0	0 38.1	0 39.3	0 40.7	0 42.2			10
10	00	0 31.2	0 31.9	0 32.6	0 33.5	0 34.4	0 35.5	0 36.6	0 37.9	0 39.3		14	00
	10	0 28.8	0 29.4	0 30.1	0 30.9	0 31.8	0 32.7	0 33.8	0 35.0	0 36.2		13	50
	20	0 26.3	0 26.9	0 27.6	0 28.3	0 29.1	0 30.0	0 30.9	0 32.0	0 33.2			40
	30	0 23.9	0 24.4	0 25.0	0 25.6	0 26.3	0 27.1	0 28.0	0 29.0	0 30.0			30
	40	0 21.3	0 21.8	0 22.3	0 22.9	0 23.5	0 24.2	0 25.0	0 25.9	0 26.8			20
	50	0 18.7	0 19.2	0 19.6	0 20.1	0 20.7	0 21.3	0 22.0	0 22.7	0 23.6			10
11	00	0 16.1	0 16.5	0 16.9	0 17.3	0 17.8	0 18.3	0 18.9	0 19.6	0 20.3		13	00
	10	0 13.5	0 13.8	0 14.1	0 14.5	0 14.9	0 15.3	0 15.8	0 16.4	0 17.0		12	50
	20	0 10.8	0 11.1	0 11.3	0 11.6	0 11.9	0 12.3	0 12.7	0 13.1	0 13.6			40
	30	0 08.1	0 08.3	0 08.5	0 08.7	0 09.0	0 09.2	0 09.5	0 09.9	0 10.2			30
	40	0 05.4	0 05.5	0 05.7	0 05.8	0 06.0	0 06.2	0 06.4	0 06.6	0 06.8			20
	50	0 02.7	0 02.8	0 02.8	0 02.9	0 03.0	0 03.1	0 03.2	0 03.3	0 03.4			10
12	00	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0		12	00
Lat.											Lat.		
H.A.		48°	50°	52°	54°	56°	58°	60°	61°	62°	H.A.		
h	m	°	'	°	'	°	'	°	'	°	'	h	m
0	00	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0		24	00
	10	0 03.5	0 03.7	0 03.9	0 04.0	0 04.3	0 04.5	0 04.8	0 04.9	0 05.1		23	50
	20	0 07.1	0 07.4	0 07.7	0 08.1	0 08.5	0 09.0	0 09.6	0 09.9	0 10.2			40
	30	0 10.6	0 11.0	0 11.5	0 12.1	0 12.7	0 13.5	0 14.3	0 14.8	0 15.3			30
	40	0 14.1	0 14.7	0 15.3	0 16.1	0 16.9	0 17.9	0 19.0	0 19.6	0 20.3			20
	50	0 17.5	0 18.3	0 19.1	0 20.1	0 21.1	0 22.3	0 23.7	0 24.5	0 25.3			10
1	00	0 21.0	0 21.9	0 22.9	0 24.0	0 25.2	0 26.7	0 28.3	0 29.3	0 30.3		23	00

POLARIS, 1966

AZIMUTH AT ALL HOUR ANGLES

[For hour angles 0^h to 12^h Polaris is west of north, and for hour angles 12^h to 24^h it is east of north]

Lat.		48°	50°	52°	54°	56°	58°	60°	61°	62°	Lat.										
H.A.												H.A.									
h	m	°	'	°	'	°	'	°	'	°	'	h	m								
1	00	0	21.0	0	21.9	0	22.9	0	24.0	0	25.2	0	26.7	0	28.3	0	29.3	0	30.3	23	00
	10	0	24.4	0	25.4	0	26.6	0	27.9	0	29.3	0	31.0	0	32.9	0	34.0	0	35.1	22	50
	20	0	27.7	0	28.9	0	30.2	0	31.7	0	33.3	0	35.2	0	37.4	0	38.6	0	39.9		40
	30	0	31.0	0	32.3	0	33.8	0	35.4	0	37.3	0	39.4	0	41.9	0	43.2	0	44.7		30
	40	0	34.2	0	35.7	0	37.3	0	39.1	0	41.2	0	43.5	0	46.2	0	47.7	0	49.3		20
	50	0	37.4	0	39.0	0	40.7	0	42.7	0	45.0	0	47.5	0	50.5	0	52.1	0	53.8		10
2	00	0	40.5	0	42.2	0	44.1	0	46.2	0	48.7	0	51.4	0	54.6	0	56.4	0	58.3	22	00
	10	0	43.5	0	45.3	0	47.3	0	49.6	0	52.3	0	55.2	0	58.6	1	00.5	1	02.6	21	50
	20	0	46.4	0	48.3	0	50.5	0	53.0	0	55.8	0	58.9	1	02.6	1	04.6	1	06.8		40
	30	0	49.2	0	51.3	0	53.6	0	56.2	0	59.1	1	02.5	1	06.3	1	08.5	1	10.8		30
	40	0	51.9	0	54.1	0	56.5	0	59.3	1	02.4	1	05.9	1	10.0	1	12.3	1	14.7		20
	50	0	54.5	0	56.8	0	59.4	1	02.3	1	05.5	1	09.3	1	13.5	1	15.9	1	18.4		10
3	00	0	57.1	0	59.4	1	02.1	1	05.1	1	08.6	1	12.4	1	16.9	1	19.4	1	22.0	21	00
	10	0	59.5	1	01.9	1	04.7	1	07.9	1	11.4	1	15.5	1	20.1	1	22.7	1	25.4	20	50
	20	1	01.7	1	04.3	1	07.2	1	10.5	1	14.1	1	18.3	1	23.1	1	25.8	1	28.7		40
	30	1	03.9	1	06.6	1	09.6	1	12.9	1	16.7	1	21.1	1	26.0	1	28.8	1	31.7		30
	40	1	05.9	1	08.7	1	11.8	1	15.2	1	19.2	1	23.6	1	28.7	1	31.6	1	34.6		20
	50	1	07.8	1	10.7	1	13.8	1	17.4	1	21.4	1	26.0	1	31.3	1	34.2	1	37.3		10
4	00	1	09.6	1	12.5	1	15.8	1	19.4	1	23.5	1	28.2	1	33.6	1	36.6	1	39.8	20	00
	10	1	11.3	1	14.2	1	17.5	1	21.3	1	25.5	1	30.3	1	35.8	1	38.8	1	42.1	19	50
	20	1	12.8	1	15.8	1	19.2	1	23.0	1	27.3	1	32.2	1	37.8	1	40.9	1	44.2		40
	30	1	14.1	1	17.2	1	20.6	1	24.5	1	28.9	1	33.9	1	39.5	1	42.7	1	46.1		30
	40	1	15.3	1	18.5	1	21.9	1	25.9	1	30.3	1	35.4	1	41.1	1	44.3	1	47.8		20
	50	1	16.4	1	19.6	1	23.1	1	27.1	1	31.6	1	36.7	1	42.5	1	45.8	1	49.3		10
5	00	1	17.3	1	20.5	1	24.1	1	28.1	1	32.7	1	37.8	1	43.7	1	47.0	1	50.5	19	00
	10	1	18.1	1	21.3	1	24.9	1	29.0	1	33.6	1	38.8	1	44.7	1	48.0	1	51.6	18	50
	20	1	18.7	1	22.0	1	25.6	1	29.7	1	34.3	1	39.5	1	45.5	1	48.8	1	52.4		40
	30	1	19.2	1	22.4	1	26.1	1	30.2	1	34.8	1	40.1	1	46.1	1	49.4	1	53.0		30
	40	1	19.5	1	22.8	1	26.4	1	30.5	1	35.2	1	40.5	1	46.5	1	49.8	1	53.4		20
	50	1	19.7	1	23.0	1	26.6	1	30.7	1	35.4	1	40.6	1	46.7	1	50.0	1	53.6		10
6	00	1	19.7	1	23.0	1	26.6	1	30.7	1	35.4	1	40.6	1	46.6	1	50.0	1	53.6	18	00
	10	1	19.6	1	22.8	1	26.5	1	30.5	1	35.2	1	40.4	1	46.4	1	49.7	1	53.3	17	50
	20	1	19.3	1	22.5	1	26.1	1	30.2	1	34.8	1	40.0	1	46.0	1	49.3	1	52.8		40
	30	1	18.8	1	22.1	1	25.7	1	29.7	1	34.3	1	39.4	1	45.4	1	48.6	1	52.2		30
	40	1	18.3	1	21.4	1	25.0	1	29.0	1	33.5	1	38.7	1	44.5	1	47.8	1	51.3		20
	50	1	17.5	1	20.7	1	24.2	1	28.2	1	32.6	1	37.7	1	43.5	1	46.7	1	50.2		10
7	00	1	16.6	1	19.8	1	23.2	1	27.2	1	31.6	1	36.6	1	42.3	1	45.5	1	48.9	17	00
	10	1	15.6	1	18.7	1	22.1	1	26.0	1	30.3	1	35.3	1	40.9	1	44.0	1	47.4	16	50
	20	1	14.5	1	17.5	1	20.8	1	24.6	1	28.9	1	33.8	1	39.3	1	42.4	1	45.7		40
	30	1	13.1	1	16.1	1	19.4	1	23.1	1	27.3	1	32.1	1	37.5	1	40.5	1	43.8		30
	40	1	11.7	1	14.6	1	17.9	1	21.5	1	25.6	1	30.3	1	35.6	1	38.5	1	41.7		20
	50	1	10.1	1	13.0	1	16.1	1	19.7	1	23.7	1	28.2	1	33.4	1	36.3	1	39.4		10
8	00	1	08.4	1	11.2	1	14.3	1	17.7	1	21.6	1	26.1	1	31.1	1	33.9	1	36.9	16	00
	10	1	06.6	1	09.3	1	12.3	1	15.6	1	19.4	1	23.8	1	28.7	1	31.4	1	34.3	15	50
	20	1	04.6	1	07.2	1	10.2	1	13.4	1	17.1	1	21.3	1	26.0	1	28.7	1	31.5		40
	30	1	02.6	1	05.1	1	07.9	1	11.1	1	14.6	1	18.6	1	23.3	1	25.8	1	28.5		30
	40	1	00.4	1	02.8	1	05.5	1	08.6	1	12.0	1	15.9	1	20.3	1	22.8	1	25.4		20
	50	0	58.1	1	00.4	1	03.0	1	05.9	1	09.2	1	13.0	1	17.2	1	19.6	1	22.1		10
9	00	0	55.7	0	57.9	1	00.4	1	03.2	1	06.4	1	09.9	1	14.0	1	16.3	1	18.7	15	00
	10	0	53.2	0	55.3	0	57.7	1	00.3	1	03.4	1	06.8	1	10.7	1	12.8	1	15.1	14	50
	20	0	50.6	0	52.6	0	54.8	0	57.4	1	00.2	1	03.5	1	07.2	1	09.2	1	11.4		40
	30	0	47.9	0	49.8	0	51.9	0	54.3	0	57.0	1	00.1	1	03.6	1	05.5	1	07.6		30
	40	0	45.1	0	46.9	0	48.9	0	51.1	0	53.7	0	56.6	0	59.9	1	01.7	1	03.6		20
	50	0	42.2	0	43.9	0	45.8	0	47.9	0	50.3	0	53.0	0	56.0	0	57.7	0	59.6		10
10	00	0	39.3	0	40.8	0	42.6	0	44.5	0	46.8	0	49.3	0	52.1	0	53.7	0	55.4	14	00

AZIMUTH AT ALL HOUR ANGLES

[For hour angles 0^h to 12^h Polaris is west of north, and for hour angles 12^h to 24^h it is east of north]

Lat. H.A.		48°	50°	52°	54°	56°	58°	60°	61°	62°	Lat. H.A.	
h m		° '	° '	° '	° '	° '	° '	° '	° '	° '	h m	
10	00	0 39.3	0 40.8	0 42.6	0 44.5	0 46.8	0 49.3	0 52.1	0 53.7	0 55.4	14	00
	10	0 36.2	0 37.7	0 39.3	0 41.1	0 43.2	0 45.5	0 48.1	0 49.6	0 51.1	13	50
	20	0 33.2	0 34.5	0 36.0	0 37.6	0 39.5	0 41.6	0 44.0	0 45.3	0 46.8		40
	30	0 30.0	0 31.2	0 32.6	0 34.1	0 35.7	0 37.7	0 39.8	0 41.0	0 42.3		30
	40	0 26.8	0 27.9	0 29.1	0 30.4	0 31.9	0 33.6	0 35.6	0 36.7	0 37.8		20
	50	0 23.6	0 24.5	0 25.6	0 26.7	0 28.1	0 29.6	0 31.3	0 32.2	0 33.2		10
11	00	0 20.3	0 21.1	0 22.0	0 23.0	0 24.1	0 25.4	0 26.9	0 27.7	0 28.6	13	00
	10	0 17.0	0 17.6	0 18.4	0 19.2	0 20.2	0 21.3	0 22.5	0 23.2	0 23.9	12	50
	20	0 13.6	0 14.1	0 14.8	0 15.4	0 16.2	0 17.1	0 18.0	0 18.6	0 19.2		40
	30	0 10.2	0 10.6	0 11.1	0 11.6	0 12.2	0 12.8	0 13.6	0 14.0	0 14.4		30
	40	0 06.8	0 07.1	0 07.4	0 07.7	0 08.1	0 08.6	0 09.1	0 09.3	0 09.6		20
	50	0 03.4	0 03.6	0 03.7	0 03.9	0 04.1	0 04.3	0 04.5	0 04.7	0 04.8		10
12	00	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	12	00
Lat. H.A.		62°	63°	64°	65°	66°	67°	68°	69°	70°	Lat. H.A.	
h m		° '	° '	° '	° '	° '	° '	° '	° '	° '	h m	
0	00	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	24	00
	10	0 05.1	0 05.3	0 05.5	0 05.7	0 05.9	0 06.2	0 06.5	0 06.8	0 07.1	23	50
	20	0 10.2	0 10.6	0 11.0	0 11.4	0 11.8	0 12.3	0 12.9	0 13.5	0 14.2		40
	30	0 15.3	0 15.8	0 16.4	0 17.0	0 17.7	0 18.5	0 19.3	0 20.2	0 21.3		30
	40	0 20.3	0 21.0	0 21.8	0 22.7	0 23.6	0 24.6	0 25.7	0 26.9	0 28.3		20
	50	0 25.3	0 26.2	0 27.2	0 28.2	0 29.4	0 30.6	0 32.0	0 33.5	0 35.2		10
1	00	0 30.3	0 31.3	0 32.5	0 33.7	0 35.1	0 36.6	0 38.3	0 40.1	0 42.1	23	00
	10	0 35.1	0 36.4	0 37.7	0 39.2	0 40.8	0 42.5	0 44.4	0 46.5	0 48.9	22	50
	20	0 39.9	0 41.4	0 42.9	0 44.6	0 46.4	0 48.3	0 50.5	0 52.9	0 55.6		40
	30	0 44.7	0 46.3	0 48.0	0 49.8	0 51.8	0 54.1	0 56.5	0 59.2	1 02.1		30
	40	0 49.3	0 51.1	0 52.9	0 55.0	0 57.2	0 59.7	1 02.3	1 05.3	1 08.5		20
	50	0 53.8	0 55.7	0 57.8	1 00.0	1 02.5	1 05.1	1 08.1	1 11.3	1 14.8		10
2	00	0 58.3	1 00.3	1 02.6	1 05.0	1 07.6	1 10.5	1 13.6	1 17.1	1 20.9	22	00
	10	1 02.6	1 04.8	1 07.2	1 09.8	1 12.6	1 15.7	1 19.0	1 22.8	1 26.9	21	50
	20	1 06.8	1 09.1	1 11.6	1 14.4	1 17.4	1 20.7	1 24.3	1 28.3	1 32.7		40
	30	1 10.8	1 13.3	1 16.0	1 18.9	1 22.1	1 25.6	1 29.4	1 33.6	1 38.2		30
	40	1 14.7	1 17.3	1 20.1	1 23.2	1 26.6	1 30.3	1 34.3	1 38.7	1 43.6		20
	50	1 18.4	1 21.2	1 24.2	1 27.4	1 30.9	1 34.8	1 39.0	1 43.6	1 48.7		10
3	00	1 22.0	1 24.9	1 28.0	1 31.4	1 35.0	1 39.1	1 43.5	1 48.3	1 53.7	21	00
	10	1 25.4	1 28.4	1 31.7	1 35.2	1 39.0	1 43.2	1 47.7	1 52.8	1 58.3	20	50
	20	1 28.7	1 31.8	1 35.1	1 38.8	1 42.7	1 47.0	1 51.8	1 57.0	2 02.8		40
	30	1 31.7	1 34.9	1 38.4	1 42.2	1 46.3	1 50.7	1 55.6	2 01.0	2 07.0		30
	40	1 34.6	1 37.9	1 41.5	1 45.4	1 49.6	1 54.2	1 59.2	2 04.8	2 10.9		20
	50	1 37.3	1 40.7	1 44.4	1 48.3	1 52.7	1 57.4	2 02.6	2 08.3	2 14.5		10
4	00	1 39.8	1 43.3	1 47.0	1 51.1	1 55.5	2 00.4	2 05.7	2 11.5	2 17.9	20	00
	10	1 42.1	1 45.7	1 49.5	1 53.7	1 58.2	2 03.1	2 08.5	2 14.5	2 21.0	19	50
	20	1 44.2	1 47.8	1 51.7	1 56.0	2 00.6	2 05.6	2 11.1	2 17.2	2 23.8		40
	30	1 46.1	1 49.8	1 53.8	1 58.1	2 02.7	2 07.8	2 13.4	2 19.6	2 26.4		30
	40	1 47.8	1 51.5	1 55.5	1 59.9	2 04.7	2 09.8	2 15.5	2 21.7	2 28.6		20
	50	1 49.3	1 53.0	1 57.1	2 01.5	2 06.3	2 11.6	2 17.3	2 23.6	2 30.6		10
5	00	1 50.5	1 54.3	1 58.5	2 02.9	2 07.8	2 13.0	2 18.8	2 25.2	2 32.2	19	00
	10	1 51.6	1 55.4	1 59.6	2 04.1	2 08.9	2 14.3	2 20.1	2 26.5	2 33.6	18	50
	20	1 52.4	1 56.3	2 00.4	2 05.0	2 09.9	2 15.2	2 21.1	2 27.5	2 34.6		40
	30	1 53.0	1 56.9	2 01.1	2 05.6	2 10.5	2 15.9	2 21.8	2 28.2	2 35.4		30
	40	1 53.4	1 57.3	2 01.5	2 06.0	2 11.0	2 16.4	2 22.2	2 28.7	2 35.8		20
	50	1 53.6	1 57.5	2 01.7	2 06.2	2 11.1	2 16.5	2 22.4	2 28.9	2 36.0		10
6	00	1 53.6	1 57.4	2 01.6	2 06.2	2 11.1	2 16.4	2 22.3	2 28.7	2 35.8	18	00

POLARIS, 1966

AZIMUTH AT ALL HOUR ANGLES

[For hour angles 0^h to 12^h Polaris is west of north, and for hour angles 12^h to 24^h it is east of north]

Lat. H.A.		Long.										Lat.	
		62°	63°	64°	65°	66°	67°	68°	69°	70°	H.A.		
h	m	°	'	°	'	°	'	°	'	°	'	h	m
6	00	1 53.6	1 57.4	2 01.6	2 06.2	2 11.1	2 16.4	2 22.3	2 28.7	2 35.8		18	00
	10	1 53.3	1 57.2	2 01.3	2 05.8	2 10.7	2 16.1	2 21.9	2 28.3	2 35.4		17	50
	20	1 52.8	1 56.7	2 00.8	2 05.3	2 10.2	2 15.5	2 21.3	2 27.7	2 34.7			40
	30	1 52.2	1 56.0	2 00.1	2 04.5	2 09.4	2 14.6	2 20.4	2 26.7	2 33.7			30
	40	1 51.3	1 55.0	1 59.1	2 03.5	2 08.3	2 13.5	2 19.2	2 25.5	2 32.3			20
	50	1 50.2	1 53.9	1 57.9	2 02.3	2 07.0	2 12.2	2 17.8	2 24.0	2 30.8			10
7	00	1 48.9	1 52.6	1 56.5	2 00.8	2 05.5	2 10.6	2 16.1	2 22.2	2 28.9		17	00
	10	1 47.4	1 51.0	1 54.9	1 59.1	2 03.7	2 08.7	2 14.2	2 20.2	2 26.8		16	50
	20	1 45.7	1 49.2	1 53.1	1 57.2	2 01.7	2 06.6	2 12.0	2 17.9	2 24.3			40
	30	1 43.8	1 47.3	1 51.0	1 55.1	1 59.5	2 04.3	2 09.6	2 15.3	2 21.7			30
	40	1 41.7	1 45.1	1 48.8	1 52.8	1 57.1	2 01.8	2 06.9	2 12.6	2 18.8			20
	50	1 39.4	1 42.7	1 46.3	1 50.2	1 54.4	1 59.0	2 04.0	2 09.5	2 15.6			10
8	00	1 36.9	1 40.2	1 43.7	1 47.5	1 51.6	1 56.1	2 00.9	2 06.3	2 12.2		16	00
	10	1 34.3	1 37.5	1 40.9	1 44.5	1 48.5	1 52.9	1 57.6	2 02.8	2 08.5		15	50
	20	1 31.5	1 34.6	1 37.9	1 41.4	1 45.3	1 49.5	1 54.1	1 59.1	2 04.6			40
	30	1 28.5	1 31.5	1 34.7	1 38.1	1 41.8	1 45.9	1 50.3	1 55.2	2 00.5			30
	40	1 25.4	1 28.2	1 31.3	1 34.6	1 38.2	1 42.1	1 46.4	1 51.1	1 56.2			20
	50	1 22.1	1 24.9	1 27.8	1 31.0	1 34.4	1 38.2	1 42.3	1 46.8	1 51.7			10
9	00	1 18.7	1 21.3	1 24.1	1 27.2	1 30.5	1 34.1	1 38.0	1 42.3	1 47.0		15	00
	10	1 15.1	1 17.6	1 20.3	1 23.2	1 26.4	1 29.8	1 33.5	1 37.6	1 42.1		14	50
	20	1 11.4	1 13.8	1 16.3	1 19.1	1 22.1	1 25.3	1 28.9	1 32.8	1 37.0			40
	30	1 07.6	1 09.8	1 12.2	1 14.8	1 17.7	1 20.7	1 24.1	1 27.8	1 31.8			30
	40	1 03.6	1 05.7	1 08.0	1 10.5	1 13.1	1 16.0	1 19.2	1 22.6	1 26.4			20
	50	0 59.6	1 01.5	1 03.7	1 06.0	1 08.4	1 11.1	1 14.1	1 17.3	1 20.9			10
10	00	0 55.4	0 57.2	0 59.2	1 01.3	1 03.6	1 06.2	1 08.9	1 11.9	1 15.2		14	00
	10	0 51.1	0 52.8	0 54.6	0 56.6	0 58.7	1 01.0	1 03.6	1 06.3	1 09.4		13	50
	20	0 46.8	0 48.3	0 50.0	0 51.8	0 53.7	0 55.8	0 58.1	1 00.7	1 03.4			40
	30	0 42.3	0 43.7	0 45.2	0 46.9	0 48.6	0 50.5	0 52.6	0 54.9	0 57.4			30
	40	0 37.8	0 39.1	0 40.4	0 41.9	0 43.4	0 45.1	0 47.0	0 49.0	0 51.3			20
	50	0 33.2	0 34.3	0 35.5	0 36.8	0 38.2	0 39.7	0 41.3	0 43.1	0 45.1			10
11	00	0 28.6	0 29.5	0 30.5	0 31.6	0 32.8	0 34.1	0 35.5	0 37.1	0 38.8		13	00
	10	0 23.9	0 24.7	0 25.5	0 26.5	0 27.4	0 28.5	0 29.7	0 31.0	0 32.4		12	50
	20	0 19.2	0 19.8	0 20.5	0 21.2	0 22.0	0 22.9	0 23.8	0 24.9	0 26.0			40
	30	0 14.4	0 14.9	0 15.4	0 15.9	0 16.5	0 17.2	0 17.9	0 18.7	0 19.5			30
	40	0 09.6	0 09.9	0 10.3	0 10.6	0 11.0	0 11.5	0 12.0	0 12.5	0 13.0			20
	50	0 04.8	0 05.0	0 05.1	0 05.3	0 05.5	0 05.7	0 06.0	0 06.2	0 06.5			10
12	00	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0	0 00.0		12	00

AUXILIARY TABLE

The main table has been computed for a declination of $89^{\circ} 06' 40''$. For other declinations of Polaris the corrections given below should be applied to the Azimuth taken from the main table. When the argument, Decl., is on the left the correction is positive; when on the right the correction is negative.

Azimuth Decl.												Azimuth			
			0'	20'	40'	60'	80'	100'	120'	140'	160'	180'	Decl.		
°	'	"	'	'	'	'	'	'	'	'	'	°	'	"	
89	06	15	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	89	07	05
89	06	20	0.0	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	89	07	00
89	06	25	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.7	0.8	89	06	55
89	06	30	0.0	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.6	89	06	50
89	06	35	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	89	06	45
89	06	40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	89	06	40

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AZIMUTH AT ELONGATION

Decl. Lat.	89°06'10"			89°06'20"			89°06'30"			89°06'40"			89°06'50"			89°07'00"			Variations for—	
	1' of Lat.			1' of Lat.			1' of Lat.			1' of Lat.			1' of Lat.			1' of Lat.			1' of Lat.	1" of s
10 00	0 54	39.8		0 54	29.7		0 54	19.5		0 54	09.4		0 53	59.2		0 53	49.1		+0.17	-1.02
10 20	0 54	43.3		0 54	33.1		0 54	22.9		0 54	12.8		0 54	02.6		0 53	52.4		0.17	1.02
10 40	0 54	46.8		0 54	36.6		0 54	26.4		0 54	16.3		0 54	06.1		0 53	55.9		0.18	1.02
11 00	0 54	50.5		0 54	40.3		0 54	30.1		0 54	19.9		0 54	09.7		0 53	59.5		0.18	1.02
11 20	0 54	54.2		0 54	44.0		0 54	33.8		0 54	23.6		0 54	13.4		0 54	03.2		0.19	1.02
11 40	0 54	58.1		0 54	47.9		0 54	37.7		0 54	27.5		0 54	17.3		0 54	07.1		0.20	1.02
12 00	0 55	02.2		0 54	51.9		0 54	41.7		0 54	31.5		0 54	21.3		0 54	11.0		+0.20	-1.02
12 20	0 55	06.3		0 54	56.1		0 54	45.8		0 54	35.6		0 54	25.4		0 54	15.1		0.21	1.02
12 40	0 55	10.6		0 55	00.3		0 54	50.1		0 54	39.8		0 54	29.6		0 54	19.3		0.22	1.02
13 00	0 55	15.0		0 55	04.7		0 54	54.4		0 54	44.2		0 54	33.9		0 54	23.7		0.22	1.03
13 20	0 55	19.5		0 55	09.2		0 54	58.9		0 54	48.7		0 54	38.4		0 54	28.1		0.23	1.03
13 40	0 55	24.1		0 55	13.8		0 55	03.5		0 54	53.3		0 54	43.0		0 54	32.7		0.23	1.03
14 00	0 55	28.9		0 55	18.6		0 55	08.3		0 54	58.0		0 54	47.7		0 54	37.4		+0.24	-1.03
14 20	0 55	33.8		0 55	23.5		0 55	13.1		0 55	02.8		0 54	52.5		0 54	42.2		0.25	1.03
14 40	0 55	38.8		0 55	28.5		0 55	18.1		0 55	07.8		0 54	57.5		0 54	47.1		0.25	1.03
15 00	0 55	44.0		0 55	33.6		0 55	23.2		0 55	12.9		0 55	02.5		0 54	52.2		0.26	1.04
15 20	0 55	49.2		0 55	38.9		0 55	28.5		0 55	18.1		0 55	07.8		0 54	57.4		0.27	1.04
15 40	0 55	54.6		0 55	44.3		0 55	33.9		0 55	23.5		0 55	13.1		0 55	02.7		0.27	1.04
16 00	0 56	00.2		0 55	49.8		0 55	39.4		0 55	29.0		0 55	18.6		0 55	08.2		+0.28	-1.04
16 20	0 56	05.9		0 55	55.4		0 55	45.0		0 55	34.6		0 55	24.2		0 55	13.7		0.29	1.04
16 40	0 56	11.7		0 56	01.2		0 55	50.8		0 55	40.3		0 55	29.9		0 55	19.5		0.29	1.04
17 00	0 56	17.6		0 56	07.1		0 55	56.7		0 55	46.2		0 55	35.8		0 55	25.3		0.30	1.05
17 20	0 56	23.7		0 56	13.2		0 56	02.7		0 55	52.2		0 55	41.8		0 55	31.3		0.31	1.05
17 40	0 56	29.9		0 56	19.4		0 56	08.9		0 55	58.4		0 55	47.9		0 55	37.4		0.31	1.05
18 00	0 56	36.2		0 56	25.7		0 56	15.2		0 56	04.7		0 55	54.2		0 55	43.7		+0.32	-1.05
18 20	0 56	42.7		0 56	32.2		0 56	21.7		0 56	11.1		0 56	00.6		0 55	50.1		0.33	1.05
18 40	0 56	49.4		0 56	38.8		0 56	28.2		0 56	17.7		0 56	07.1		0 55	56.6		0.33	1.06
19 00	0 56	56.1		0 56	45.6		0 56	35.0		0 56	24.4		0 56	13.8		0 56	03.2		0.34	1.06
19 20	0 57	03.0		0 56	52.4		0 56	41.9		0 56	31.3		0 56	20.7		0 56	10.1		0.35	1.06
19 40	0 57	10.1		0 56	59.5		0 56	48.9		0 56	38.2		0 56	27.6		0 56	17.0		0.35	1.06
20 00	0 57	17.3		0 57	06.7		0 56	56.0		0 56	45.4		0 56	34.7		0 56	24.1		+0.36	-1.06
20 20	0 57	24.7		0 57	14.0		0 57	03.3		0 56	52.7		0 56	42.0		0 56	31.3		0.37	1.07
20 40	0 57	32.2		0 57	21.5		0 57	10.8		0 57	00.1		0 56	49.4		0 56	38.7		0.38	1.07
21 00	0 57	39.8		0 57	29.1		0 57	18.4		0 57	07.7		0 56	57.0		0 56	46.3		0.38	1.07
21 20	0 57	47.6		0 57	36.9		0 57	26.2		0 57	15.4		0 57	04.7		0 56	53.9		0.39	1.07
21 40	0 57	55.6		0 57	44.8		0 57	34.1		0 57	23.3		0 57	12.5		0 57	01.8		0.40	1.08
22 00	0 58	03.7		0 57	52.9		0 57	42.1		0 57	31.3		0 57	20.5		0 57	09.8		+0.41	-1.08
22 20	0 58	12.0		0 58	01.1		0 57	50.3		0 57	39.5		0 57	28.7		0 57	17.9		0.41	1.08
22 40	0 58	20.4		0 58	09.5		0 57	58.7		0 57	47.9		0 57	37.0		0 57	26.2		0.42	1.08
23 00	0 58	29.0		0 58	18.1		0 58	07.2		0 57	56.4		0 57	45.5		0 57	34.7		0.43	1.09
23 20	0 58	37.7		0 58	26.8		0 58	15.9		0 58	05.0		0 57	54.2		0 57	43.3		0.44	1.09
23 40	0 58	46.6		0 58	35.7		0 58	24.8		0 58	13.9		0 58	03.0		0 57	52.0		0.45	1.09
24 00	0 58	55.7		0 58	44.8		0 58	33.8		0 58	22.9		0 58	11.9		0 58	01.0		+0.46	-1.09
24 20	0 59	04.9		0 58	54.0		0 58	43.0		0 58	32.0		0 58	21.0		0 58	10.1		0.46	1.10
24 40	0 59	14.4		0 59	03.4		0 58	52.4		0 58	41.3		0 58	30.3		0 58	19.3		0.47	1.10
25 00	0 59	23.9		0 59	12.9		0 59	01.9		0 58	50.8		0 58	39.8		0 58	28.8		0.48	1.10
25 20	0 59	33.7		0 59	22.6		0 59	11.6		0 59	00.5		0 58	49.4		0 58	38.4		0.49	1.11
25 40	0 59	43.6		0 59	32.5		0 59	21.4		0 59	10.3		0 58	59.3		0 58	48.2		0.50	1.11
26 00	0 59	53.7		0 59	42.6		0 59	31.5		0 59	20.4		0 59	09.2		0 58	58.1		+0.51	-1.11
26 20	1 00	04.0		0 59	52.9		0 59	41.7		0 59	30.6		0 59	19.4		0 59	08.2		0.52	1.12
26 40	1 00	14.5		1 00	03.3		0 59	52.1		0 59	40.9		0 59	29.7		0 59	18.5		0.52	1.12
27 00	1 00	25.2		1 00	13.9		1 00	02.7		0 59	51.5		0 59	40.3		0 59	29.0		0.53	1.12
27 20	1 00	36.0		1 00	24.7		1 00	13.5		1 00	02.2		0 59	51.0		0 59	39.7		0.54	1.13
27 40	1 00	47.0		1 00	35.7		1 00	24.4		1 00	13.1		1 00	01.9		0 59	50.6		0.55	1.13
28 00	1 00	58.2		1 00	46.9		1 00	35.6		1 00	24.3		1 00	12.9		1 00	01.6		+0.56	-1.13
28 20	1 01	09.7		1 00	58.3		1 00	46.9		1 00	35.6		1 00	24.2		1 00	12.9		0.57	1.14
28 40	1 01	21.3		1 01	09.9		1 00	58.5		1 00	47.1		1 00	35.7		1 00	24.3		0.58	1.14
29 00	1 01	33.1		1 01	21.6		1 01	10.2		1 00	58.8		1 00	47.3		1 00	35.9		0.59	1.14
29 20	1 01	45.1		1 01	33.6		1 01	22.2		1 01	10.7		1 00	59.2		1 00	47.7		0.60	1.15
29 40	1 01	57.3		1 01	45.8		1 01	34.3		1 01	22.8		1 01	11.3		1 00	59.8		0.61	1.15
30 00	1 02	09.7		1 01	58.2		1 01	46.6		1 01	35.1		1 01	23.5		1 01	12.0		+0.62	-1.15

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Decl. Lat.							Variations for—	
	89°06'10"	89°06'20"	89°06'30"	89°06'40"	89°06'50"	89°07'00"	1' of Lat.	1' of δ
30 00	1 02 09.7	1 01 58.2	1 01 46.6	1 01 35.1	1 01 23.5	1 01 12.0	+0.62	-1.15
30 10	1 02 16.0	1 02 04.5	1 01 52.9	1 01 41.3	1 01 29.8	1 01 18.2	0.63	1.16
30 20	1 02 22.4	1 02 10.8	1 01 59.2	1 01 47.6	1 01 36.0	1 01 24.4	0.63	1.16
30 30	1 02 28.8	1 02 17.2	1 02 05.6	1 01 53.9	1 01 42.3	1 01 30.7	0.64	1.16
30 40	1 02 35.2	1 02 23.6	1 02 12.0	1 02 00.3	1 01 48.7	1 01 37.1	0.64	1.16
30 50	1 02 41.7	1 02 30.1	1 02 18.4	1 02 06.8	1 01 55.1	1 01 43.5	0.65	1.16
31 00	1 02 48.3	1 02 36.6	1 02 24.9	1 02 13.3	1 02 01.6	1 01 49.9	+0.65	-1.17
31 10	1 02 54.9	1 02 43.2	1 02 31.5	1 02 19.8	1 02 08.1	1 01 56.5	0.66	1.17
31 20	1 03 01.6	1 02 49.9	1 02 38.2	1 02 26.4	1 02 14.7	1 02 03.0	0.67	1.17
31 30	1 03 08.3	1 02 56.6	1 02 44.8	1 02 33.1	1 02 21.4	1 02 09.6	0.67	1.17
31 40	1 03 15.1	1 03 03.3	1 02 51.6	1 02 39.8	1 02 28.1	1 02 16.3	0.68	1.17
31 50	1 03 21.9	1 03 10.1	1 02 58.4	1 02 46.6	1 02 34.8	1 02 23.1	0.68	1.18
32 00	1 03 28.8	1 03 17.0	1 03 05.2	1 02 53.4	1 02 41.6	1 02 29.8	+0.69	-1.18
32 10	1 03 35.8	1 03 23.9	1 03 12.1	1 03 00.3	1 02 48.5	1 02 36.7	0.69	1.18
32 20	1 03 42.8	1 03 30.9	1 03 19.1	1 03 07.3	1 02 55.4	1 02 43.6	0.70	1.18
32 30	1 03 49.8	1 03 38.0	1 03 26.1	1 03 14.3	1 03 02.4	1 02 50.6	0.71	1.19
32 40	1 03 57.0	1 03 45.1	1 03 33.2	1 03 21.3	1 03 09.4	1 02 57.6	0.71	1.19
32 50	1 04 04.2	1 03 52.3	1 03 40.4	1 03 28.4	1 03 16.5	1 03 04.6	0.72	1.19
33 00	1 04 11.4	1 03 59.5	1 03 47.6	1 03 35.6	1 03 23.7	1 03 11.8	+0.72	-1.19
33 10	1 04 18.7	1 04 06.8	1 03 54.8	1 03 42.9	1 03 30.9	1 03 19.0	0.73	1.19
33 20	1 04 26.1	1 04 14.1	1 04 02.1	1 03 50.2	1 03 38.2	1 03 26.2	0.74	1.20
33 30	1 04 33.5	1 04 21.5	1 04 09.5	1 03 57.5	1 03 45.5	1 03 33.5	0.74	1.20
33 40	1 04 41.0	1 04 29.0	1 04 17.0	1 04 04.9	1 03 52.9	1 03 40.9	0.75	1.20
33 50	1 04 48.5	1 04 36.5	1 04 24.5	1 04 12.4	1 04 00.4	1 03 48.3	0.75	1.20
34 00	1 04 56.2	1 04 44.1	1 04 32.0	1 04 20.0	1 04 07.9	1 03 55.8	+0.76	-1.21
34 10	1 05 03.8	1 04 51.7	1 04 39.7	1 04 27.6	1 04 15.5	1 04 03.4	0.77	1.21
34 20	1 05 11.6	1 04 59.5	1 04 47.4	1 04 35.2	1 04 23.1	1 04 11.0	0.77	1.21
34 30	1 05 19.4	1 05 07.2	1 04 55.1	1 04 43.0	1 04 30.8	1 04 18.7	0.78	1.21
34 40	1 05 27.2	1 05 15.1	1 05 02.9	1 04 50.8	1 04 38.6	1 04 26.5	0.79	1.22
34 50	1 05 35.2	1 05 23.0	1 05 10.8	1 04 58.6	1 04 46.4	1 04 34.3	0.79	1.22
35 00	1 05 43.2	1 05 31.0	1 05 18.8	1 05 06.6	1 04 54.3	1 04 42.1	+0.80	-1.22
35 10	1 05 51.2	1 05 39.0	1 05 26.8	1 05 14.5	1 05 02.3	1 04 50.1	0.80	1.22
35 20	1 05 59.4	1 05 47.1	1 05 34.9	1 05 22.6	1 05 10.3	1 04 58.1	0.81	1.23
35 30	1 06 07.6	1 05 55.3	1 05 43.0	1 05 30.7	1 05 18.4	1 05 06.2	0.82	1.23
35 40	1 06 15.8	1 06 03.5	1 05 51.2	1 05 38.9	1 05 26.6	1 05 14.3	0.82	1.23
35 50	1 06 24.2	1 06 11.8	1 05 59.5	1 05 47.2	1 05 34.8	1 05 22.5	0.83	1.23
36 00	1 06 32.6	1 06 20.2	1 06 07.9	1 05 55.5	1 05 43.1	1 05 30.8	+0.84	-1.24
36 10	1 06 41.1	1 06 28.7	1 06 16.3	1 06 03.9	1 05 51.5	1 05 39.1	0.85	1.24
36 20	1 06 49.6	1 06 37.2	1 06 24.8	1 06 12.4	1 05 59.9	1 05 47.5	0.85	1.24
36 30	1 06 58.2	1 06 45.8	1 06 33.3	1 06 20.9	1 06 08.5	1 05 56.0	0.86	1.24
36 40	1 07 06.9	1 06 54.4	1 06 42.0	1 06 29.5	1 06 17.0	1 06 04.6	0.87	1.25
36 50	1 07 15.7	1 07 03.2	1 06 50.7	1 06 38.2	1 06 25.7	1 06 13.2	0.87	1.25
37 00	1 07 24.5	1 07 12.0	1 06 59.4	1 06 46.9	1 06 34.4	1 06 21.9	+0.88	-1.25
37 10	1 07 33.4	1 07 20.8	1 07 08.3	1 06 55.7	1 06 43.2	1 06 30.6	0.89	1.25
37 20	1 07 42.4	1 07 29.8	1 07 17.2	1 07 04.6	1 06 52.1	1 06 39.5	0.90	1.26
37 30	1 07 51.4	1 07 38.8	1 07 26.2	1 07 13.6	1 07 01.0	1 06 48.4	0.90	1.26
37 40	1 08 00.6	1 07 47.9	1 07 35.3	1 07 22.6	1 07 10.0	1 06 57.4	0.91	1.26
37 50	1 08 09.8	1 07 57.1	1 07 44.4	1 07 31.8	1 07 19.1	1 07 06.4	0.92	1.27
38 00	1 08 19.0	1 08 06.3	1 07 53.6	1 07 41.0	1 07 28.3	1 07 15.6	+0.93	-1.27
38 10	1 08 28.4	1 08 15.7	1 08 02.9	1 07 50.2	1 07 37.5	1 07 24.8	0.93	1.27
38 20	1 08 37.8	1 08 25.1	1 08 12.3	1 07 59.6	1 07 46.8	1 07 34.1	0.94	1.27
38 30	1 08 47.3	1 08 34.6	1 08 21.8	1 08 09.0	1 07 56.2	1 07 43.4	0.95	1.28
38 40	1 08 56.9	1 08 44.1	1 08 31.3	1 08 18.5	1 08 05.7	1 07 52.9	0.96	1.28
38 50	1 09 06.6	1 08 53.8	1 08 40.9	1 08 28.1	1 08 15.2	1 08 02.4	0.97	1.28
39 00	1 09 16.3	1 09 03.5	1 08 50.6	1 08 37.7	1 08 24.9	1 08 12.0	+0.97	-1.29
39 10	1 09 26.2	1 09 13.3	1 09 00.4	1 08 47.5	1 08 34.6	1 08 21.7	0.98	1.29
39 20	1 09 36.1	1 09 23.2	1 09 10.2	1 08 57.3	1 08 44.4	1 08 31.4	0.99	1.29
39 30	1 09 46.1	1 09 33.1	1 09 20.2	1 09 07.2	1 08 54.2	1 08 41.3	1.00	1.30
39 40	1 09 56.2	1 09 43.2	1 09 30.2	1 09 17.2	1 09 04.2	1 08 51.2	1.01	1.30
39 50	1 10 06.3	1 09 53.3	1 09 40.3	1 09 27.3	1 09 14.2	1 09 01.2	1.01	1.30
40 00	1 10 16.6	1 10 03.5	1 09 50.5	1 09 37.4	1 09 24.4	1 09 11.3	+1.02	-1.31

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Decl. Lat.	89°06'10"			89°06'20"			89°06'30"			89°06'40"			89°06'50"			89°07'00"			Variations for—	
																			1' of Lat.	1' of δ
40 00	1	10	16.6	1	10	03.5	1	09	50.5	1	09	37.4	1	09	24.4	1	09	11.3	+1.02	-1.31
40 10	1	10	26.9	1	10	13.8	1	10	00.7	1	09	47.7	1	09	34.6	1	09	21.5	1.03	1.31
40 20	1	10	37.3	1	10	24.2	1	10	11.1	1	09	58.0	1	09	44.9	1	09	31.7	1.04	1.31
40 30	1	10	47.9	1	10	34.7	1	10	21.6	1	10	08.4	1	09	55.3	1	09	42.1	1.05	1.32
40 40	1	10	58.5	1	10	45.3	1	10	32.1	1	10	18.9	1	10	05.7	1	09	52.5	1.06	1.32
40 50	1	11	09.1	1	10	55.9	1	10	42.7	1	10	29.5	1	10	16.3	1	10	03.1	1.07	1.32
41 00	1	11	19.9	1	11	06.7	1	10	53.4	1	10	40.2	1	10	26.9	1	10	13.7	+1.08	-1.33
41 10	1	11	30.8	1	11	17.5	1	11	04.2	1	10	50.9	1	10	37.7	1	10	24.4	1.08	1.33
41 20	1	11	41.8	1	11	28.4	1	11	15.1	1	11	01.8	1	10	48.5	1	10	35.2	1.09	1.33
41 30	1	11	52.8	1	11	39.5	1	11	26.1	1	11	12.8	1	10	59.4	1	10	46.0	1.10	1.34
41 40	1	12	04.0	1	11	50.6	1	11	37.2	1	11	23.8	1	11	10.4	1	10	57.0	1.11	1.34
41 50	1	12	15.2	1	12	01.8	1	11	48.4	1	11	34.9	1	11	21.5	1	11	08.1	1.12	1.34
42 00	1	12	26.5	1	12	13.1	1	11	59.6	1	11	46.2	1	11	32.7	1	11	19.2	+1.13	-1.35
42 10	1	12	38.0	1	12	24.5	1	12	11.0	1	11	57.5	1	11	44.0	1	11	30.5	1.14	1.35
42 20	1	12	49.5	1	12	36.0	1	12	22.4	1	12	08.9	1	11	55.4	1	11	41.9	1.15	1.35
42 30	1	13	01.1	1	12	47.6	1	12	34.0	1	12	20.4	1	12	06.9	1	11	53.3	1.16	1.36
42 40	1	13	12.9	1	12	59.3	1	12	45.7	1	12	32.1	1	12	18.5	1	12	04.9	1.17	1.36
42 50	1	13	24.7	1	13	11.1	1	12	57.4	1	12	43.8	1	12	30.1	1	12	16.5	1.18	1.36
43 00	1	13	36.6	1	13	23.0	1	13	09.3	1	12	55.6	1	12	41.9	1	12	28.3	+1.19	-1.37
43 10	1	13	48.7	1	13	34.9	1	13	21.2	1	13	07.5	1	12	53.8	1	12	40.1	1.20	1.37
43 20	1	14	00.8	1	13	47.0	1	13	33.3	1	13	19.5	1	13	05.8	1	12	52.0	1.21	1.37
43 30	1	14	13.0	1	13	59.2	1	13	45.5	1	13	31.7*	1	13	17.9	1	13	04.1	1.22	1.38
43 40	1	14	25.4	1	14	11.6	1	13	57.7	1	13	43.9	1	13	30.1	1	13	16.3	1.23	1.38
43 50	1	14	37.8	1	14	24.0	1	14	10.1	1	13	56.2	1	13	42.4	1	13	28.5	1.24	1.39
44 00	1	14	50.4	1	14	36.5	1	14	22.6	1	14	08.7	1	13	54.8	1	13	40.9	+1.25	-1.39
44 10	1	15	03.1	1	14	49.1	1	14	35.2	1	14	21.2	1	14	07.3	1	13	53.4	1.26	1.39
44 20	1	15	15.9	1	15	01.9	1	14	47.9	1	14	33.9	1	14	19.9	1	14	05.9	1.28	1.40
44 30	1	15	28.7	1	15	14.7	1	15	00.7	1	14	46.7	1	14	32.7	1	14	18.6	1.29	1.40
44 40	1	15	41.7	1	15	27.7	1	15	13.6	1	14	59.6	1	14	45.5	1	14	31.4	1.30	1.41
44 50	1	15	54.9	1	15	40.8	1	15	26.7	1	15	12.6	1	14	58.5	1	14	44.4	1.31	1.41
45 00	1	16	08.1	1	15	54.0	1	15	39.8	1	15	25.7	1	15	11.5	1	14	57.4	+1.32	-1.41
45 10	1	16	21.4	1	16	07.3	1	15	53.1	1	15	38.9	1	15	24.7	1	15	10.5	1.33	1.42
45 20	1	16	34.9	1	16	20.7	1	16	06.5	1	15	52.2	1	15	38.0	1	15	23.8	1.34	1.42
45 30	1	16	48.5	1	16	34.2	1	16	20.0	1	16	05.7	1	15	51.4	1	15	37.2	1.36	1.43
45 40	1	17	02.2	1	16	47.9	1	16	33.6	1	16	19.3	1	16	05.0	1	15	50.6	1.37	1.43
45 50	1	17	16.0	1	17	01.7	1	16	47.3	1	16	33.0	1	16	18.6	1	16	04.3	1.38	1.44
46 00	1	17	30.0	1	17	15.6	1	17	01.2	1	16	46.8	1	16	32.4	1	16	18.0	+1.39	-1.44
46 10	1	17	44.0	1	17	29.6	1	17	15.2	1	17	00.7	1	16	46.3	1	16	31.8	1.40	1.44
46 20	1	17	58.2	1	17	43.8	1	17	29.3	1	17	14.8	1	17	00.3	1	16	45.8	1.42	1.45
46 30	1	18	12.6	1	17	58.0	1	17	43.5	1	17	29.0	1	17	14.4	1	16	59.9	1.43	1.45
46 40	1	18	27.0	1	18	12.4	1	17	57.9	1	17	43.3	1	17	28.7	1	17	14.1	1.44	1.46
46 50	1	18	41.6	1	18	27.0	1	18	12.4	1	17	57.7	1	17	43.1	1	17	28.5	1.46	1.46
47 00	1	18	56.3	1	18	41.6	1	18	27.0	1	18	12.3	1	17	57.6	1	17	43.0	+1.47	-1.47
47 10	1	19	11.1	1	18	56.4	1	18	41.7	1	18	27.0	1	18	12.3	1	17	57.6	1.48	1.47
47 20	1	19	26.1	1	19	11.4	1	18	56.6	1	18	41.9	1	18	27.1	1	18	12.3	1.50	1.48
47 30	1	19	41.2	1	19	26.4	1	19	11.6	1	18	56.8	1	18	42.0	1	18	27.2	1.51	1.48
47 40	1	19	56.5	1	19	41.6	1	19	26.8	1	19	11.9	1	18	57.1	1	18	42.2	1.52	1.49
47 50	1	20	11.9	1	19	57.0	1	19	42.1	1	19	27.2	1	19	12.3	1	18	57.4	1.54	1.49
48 00	1	20	27.4	1	20	12.5	1	19	57.5	1	19	42.6	1	19	27.6	1	19	12.7	+1.55	-1.49
48 10	1	20	43.1	1	20	28.1	1	20	13.1	1	19	58.1	1	19	43.1	1	19	28.1	1.56	1.50
48 20	1	20	58.9	1	20	43.8	1	20	28.8	1	20	13.8	1	19	58.7	1	19	43.7	1.58	1.50
48 30	1	21	14.8	1	20	59.7	1	20	44.7	1	20	29.6	1	20	14.5	1	19	59.4	1.59	1.51
48 40	1	21	30.9	1	21	15.8	1	21	00.7	1	20	45.5	1	20	30.4	1	20	15.2	1.61	1.51
48 50	1	21	47.2	1	21	32.0	1	21	16.8	1	21	01.6	1	20	46.4	1	20	31.2	1.62	1.52
49 00	1	22	03.6	1	21	48.4	1	21	33.1	1	21	17.9	1	21	02.6	1	20	47.4	+1.64	-1.52
49 10	1	22	20.2	1	22	04.9	1	21	49.6	1	21	34.3	1	21	19.0	1	21	03.7	1.65	1.53
49 20	1	22	36.9	1	22	21.5	1	22	06.2	1	21	50.8	1	21	35.5	1	21	20.1	1.67	1.53
49 30	1	22	53.7	1	22	38.3	1	22	22.9	1	22	07.5	1	21	52.1	1	21	36.7	1.68	1.54
49 40	1	23	10.8	1	22	55.3	1	22	39.8	1	22	24.4	1	22	08.9	1	21	53.5	1.70	1.55
49 50	1	23	27.9	1	23	12.4	1	22	56.9	1	22	41.4	1	22	25.9	1	22	10.4	1.72	1.55
50 00	1	23	45.3	1	23	29.7	1	23	14.2	1	22	58.6	1	22	43.0	1	22	27.5	+1.73	-1.56

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Decl.														Variations for—										
		89°06'10"			89°06'20"			89°06'30"			89°06'40"			89°06'50"			89°07'00"			1' of Lat.	1' of δ			
Lat.		°	'	"	°	'	"	°	'	"	°	'	"	°	'	"	°	'	"	°	'	"		
50 00		1	23	45.3	1	23	29.7	1	23	14.2	1	22	58.6	1	22	43.0	1	22	27.5	+1.73	-1.56			
50 10		1	24	02.8	1	23	47.2	1	23	31.6	1	23	15.9	1	23	00.3	1	22	44.7	1.75	1.56			
50 20		1	24	20.5	1	24	04.8	1	23	49.1	1	23	33.5	1	23	17.8	1	23	02.1	1.76	1.57			
50 30		1	24	38.3	1	24	22.6	1	24	06.8	1	23	51.1	1	23	35.4	1	23	19.7	1.78	1.57			
50 40		1	24	56.3	1	24	40.5	1	24	24.7	1	24	09.0	1	23	53.2	1	23	37.4	1.80	1.58			
50 50		1	25	14.5	1	24	58.7	1	24	42.8	1	24	27.0	1	24	11.1	1	23	55.3	1.82	1.58			
51 00		1	25	32.8	1	25	16.9	1	25	01.1	1	24	45.2	1	24	29.3	1	24	13.4	+1.83	-1.59			
51 10		1	25	51.4	1	25	35.4	1	25	19.5	1	25	03.5	1	24	47.6	1	24	31.6	1.85	1.60			
51 20		1	26	10.1	1	25	54.1	1	25	38.1	1	25	22.1	1	25	06.0	1	24	50.0	1.87	1.60			
51 30		1	26	29.0	1	26	12.9	1	25	56.8	1	25	40.8	1	25	24.7	1	25	08.6	1.89	1.61			
51 40		1	26	48.0	1	26	31.9	1	26	15.8	1	25	59.7	1	25	43.5	1	25	27.4	1.90	1.61			
51 50		1	27	07.3	1	26	51.1	1	26	34.9	1	26	18.7	1	26	02.6	1	25	46.4	1.92	1.62			
52 00		1	27	26.7	1	27	10.5	1	26	54.2	1	26	38.0	1	26	21.8	1	26	05.5	+1.94	-1.62			
52 10		1	27	46.4	1	27	30.1	1	27	13.8	1	26	57.5	1	26	41.1	1	26	24.8	1.96	1.63			
52 20		1	28	06.2	1	27	49.8	1	27	33.5	1	27	17.1	1	27	00.7	1	26	44.4	1.98	1.64			
52 30		1	28	26.2	1	28	09.8	1	27	53.4	1	27	36.9	1	27	20.5	1	27	04.1	2.00	1.64			
52 40		1	28	46.4	1	28	30.0	1	28	13.5	1	27	57.0	1	27	40.5	1	27	24.0	2.02	1.65			
52 50		1	29	06.9	1	28	50.3	1	28	33.8	1	28	17.2	1	28	00.6	1	27	44.1	2.04	1.66			
53 00		1	29	27.5	1	29	10.9	1	28	54.2	1	28	37.6	1	28	21.0	1	28	04.4	+2.06	-1.66			
53 10		1	29	48.3	1	29	31.6	1	29	14.9	1	28	58.3	1	28	41.6	1	28	24.9	2.08	1.67			
53 20		1	30	09.3	1	29	52.6	1	29	35.8	1	29	19.1	1	29	02.3	1	28	45.6	2.10	1.67			
53 30		1	30	30.6	1	30	13.8	1	29	57.0	1	29	40.1	1	29	23.3	1	29	06.5	2.12	1.68			
53 40		1	30	52.1	1	30	35.2	1	30	18.3	1	30	01.4	1	29	44.5	1	29	27.6	2.14	1.69			
53 50		1	31	13.7	1	30	56.8	1	30	39.8	1	30	22.9	1	30	05.9	1	29	49.0	2.17	1.69			
54 00		1	31	35.6	1	31	18.6	1	31	01.6	1	30	44.6	1	30	27.6	1	30	10.5	+2.19	-1.70			
54 10		1	31	57.8	1	31	40.7	1	31	23.6	1	31	06.5	1	30	49.4	1	30	32.3	2.21	1.71			
54 20		1	32	20.1	1	32	02.9	1	31	45.8	1	31	28.6	1	31	11.5	1	30	54.3	2.23	1.72			
54 30		1	32	42.7	1	32	25.4	1	32	08.2	1	31	51.0	1	31	33.8	1	31	16.5	2.26	1.72			
54 40		1	33	05.5	1	32	48.2	1	32	30.9	1	32	13.6	1	31	56.3	1	31	39.0	2.28	1.73			
54 50		1	33	28.5	1	33	11.2	1	32	53.8	1	32	36.4	1	32	19.1	1	32	01.7	2.30	1.74			
55 00		1	33	51.8	1	33	34.4	1	33	16.9	1	32	59.5	1	32	42.0	1	32	24.6	+2.33	-1.74			
55 10		1	34	15.3	1	33	57.8	1	33	40.3	1	33	22.8	1	33	05.3	1	32	47.8	2.35	1.75			
55 20		1	34	39.1	1	34	21.5	1	34	03.9	1	33	46.3	1	33	28.8	1	33	11.2	2.37	1.76			
55 30		1	35	03.1	1	34	45.5	1	34	27.8	1	34	10.1	1	33	52.5	1	33	34.8	2.40	1.77			
55 40		1	35	27.4	1	35	09.7	1	34	51.9	1	34	34.2	1	34	16.4	1	33	58.7	2.42	1.77			
55 50		1	35	51.9	1	35	34.1	1	35	16.3	1	34	58.5	1	34	40.7	1	34	22.9	2.45	1.78			
56 00		1	36	16.7	1	35	58.8	1	35	40.9	1	35	23.0	1	35	05.2	1	34	47.3	+2.48	-1.79			
56 10		1	36	41.8	1	36	23.8	1	36	05.8	1	35	47.9	1	35	29.9	1	35	11.9	2.50	1.80			
56 20		1	37	07.1	1	36	49.0	1	36	31.0	1	36	12.9	1	35	54.9	1	35	36.9	2.53	1.80			
56 30		1	37	32.7	1	37	14.5	1	36	56.4	1	36	38.3	1	36	20.2	1	36	02.0	2.56	1.81			
56 40		1	37	58.5	1	37	40.3	1	37	22.1	1	37	03.9	1	36	45.7	1	36	27.5	2.58	1.82			
56 50		1	38	24.7	1	38	06.4	1	37	48.1	1	37	29.8	1	37	11.5	1	36	53.3	2.61	1.83			
57 00		1	38	51.1	1	38	32.7	1	38	14.4	1	37	56.0	1	37	37.6	1	37	19.3	+2.64	-1.84			
57 10		1	39	17.8	1	38	59.4	1	38	40.9	1	38	22.5	1	38	04.0	1	37	45.6	2.67	1.84			
57 20		1	39	44.8	1	39	26.3	1	39	07.8	1	38	49.2	1	38	30.7	1	38	12.2	2.70	1.85			
57 30		1	40	12.1	1	39	53.5	1	39	34.9	1	39	16.3	1	38	57.7	1	38	39.1	2.73	1.86			
57 40		1	40	39.8	1	40	21.1	1	40	02.4	1	39	43.7	1	39	24.9	1	39	06.2	2.76	1.87			
57 50		1	41	07.7	1	40	48.9	1	40	30.1	1	40	11.3	1	39	52.5	1	39	33.7	2.79	1.88			
58 00		1	41	35.9	1	41	17.0	1	40	58.2	1	40	39.3	1	40	20.4	1	40	01.5	+2.82	-1.89			
58 10		1	42	04.5	1	41	45.5	1	41	26.5	1	41	07.6	1	40	48.6	1	40	29.6	2.85	1.90			
58 20		1	42	33.3	1	42	14.3	1	41	55.2	1	41	36.2	1	41	17.1	1	40	58.0	2.88	1.91			
58 30		1	43	02.5	1	42	43.4	1	42	24.2	1	42	05.1	1	41	45.9	1	41	26.8	2.92	1.91			
58 40		1	43	32.0	1	43	12.8	1	42	53.6	1	42	34.3	1	42	15.1	1	41	55.8	2.95	1.92			
58 50		1	44	01.9	1	43	42.6	1	43	23.2	1	43	03.9	1	42	44.6	1	42	25.2	2.98	1.93			
59 00		1	44	32.1	1	44	12.7	1	43	53.2	1	43	33.8	1	43	14.4	1	42	55.0	+3.02	-1.94			
59 10		1	45	02.6	1	44	43.1	1	44	23.6	1	44	04.1	1	43	44.6	1	43	25.1	3.05	1.95			
59 20		1	45	33.5	1	45	13.9	1	44	54.3	1	44	34.7	1	44	15.1	1	43	55.5	3.09	1.96			
59 30		1	46	04.8	1	45	45.1	1	45	25.4	1	45	05.7	1	44	46.0	1	44	26.3	3.12	1.97			
59 40		1	46	36.4	1	46	16.6	1	45	56.8	1	45	37.0	1	45	17.2	1	44	57.4	3.16	1.98			
59 50		1	47	08.4	1	46	48.5	1	46	28.6	1	46	08.7	1	45	48.8	1	45	28.9	3.20	1.99			
60 00		1	47	40.8	1	47	20.8	1	47	00.8	1	46	40.8	1	46	20.8	1	46	00.8	+3.24	-2.00			

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Decl. Lat.	89°06'10"			89°06'20"			89°06'30"			89°06'40"			89°06'50"			89°07'00"			Variations for—	
																			1' of Lat.	1' of s
60 00	1	47	40.8	1	47	20.8	1	47	00.8	1	46	40.8	1	46	20.8	1	46	00.8	+3.24	-2.00
60 10	1	48	13.5	1	47	53.4	1	47	33.3	1	47	13.2	1	46	53.1	1	46	33.0	3.27	2.01
60 20	1	48	46.7	1	48	26.5	1	48	06.3	1	47	46.1	1	47	25.8	1	47	05.6	3.31	2.02
60 30	1	49	20.2	1	48	59.9	1	48	39.6	1	48	19.3	1	47	59.0	1	47	38.7	3.35	2.03
60 40	1	49	54.2	1	49	33.8	1	49	13.3	1	48	52.9	1	48	32.5	1	48	12.1	3.39	2.04
60 50	1	50	28.5	1	50	08.0	1	49	47.5	1	49	26.9	1	49	06.4	1	48	45.9	3.43	2.05
61 00	1	51	03.3	1	50	42.7	1	50	22.0	1	50	01.4	1	49	40.8	1	49	20.1	+3.48	-2.06
61 10	1	51	38.5	1	51	17.7	1	50	57.0	1	50	36.3	1	50	15.5	1	49	54.8	3.52	2.07
61 20	1	52	14.1	1	51	53.3	1	51	32.4	1	51	11.5	1	50	50.7	1	50	29.8	3.56	2.09
61 30	1	52	50.2	1	52	29.2	1	52	08.2	1	51	47.3	1	51	26.3	1	51	05.3	3.61	2.10
61 40	1	53	26.7	1	53	05.6	1	52	44.5	1	52	23.4	1	52	02.4	1	51	41.3	3.65	2.11
61 50	1	54	03.6	1	53	42.5	1	53	21.3	1	53	00.1	1	52	38.9	1	52	17.7	3.70	2.12
62 00	1	54	41.1	1	54	19.8	1	53	58.5	1	53	37.1	1	53	15.8	1	52	54.5	+3.74	-2.13
62 10	1	55	19.0	1	54	57.5	1	54	36.1	1	54	14.7	1	53	53.3	1	53	31.8	3.79	2.14
62 20	1	55	57.3	1	55	35.8	1	55	14.2	1	54	52.7	1	54	31.2	1	54	09.6	3.84	2.15
62 30	1	56	36.2	1	56	14.5	1	55	52.9	1	55	31.2	1	55	09.5	1	54	47.9	3.89	2.17
62 40	1	57	15.6	1	56	53.8	1	56	32.0	1	56	10.2	1	55	48.4	1	55	26.6	3.94	2.18
62 50	1	57	55.4	1	57	33.5	1	57	11.6	1	56	49.7	1	56	27.8	1	56	05.9	3.99	2.19
63 00	1	58	35.8	1	58	13.8	1	57	51.7	1	57	29.7	1	57	07.7	1	56	45.6	+4.04	-2.20
63 10	1	59	16.7	1	58	54.5	1	58	32.4	1	58	10.2	1	57	48.1	1	57	25.9	4.09	2.22
63 20	1	59	58.2	1	59	35.9	1	59	13.6	1	58	51.3	1	58	29.0	1	58	06.7	4.15	2.23
63 30	2	00	40.1	2	00	17.7	1	59	55.3	1	59	32.9	1	59	10.4	1	58	48.0	4.20	2.24
63 40	2	01	22.7	2	01	00.1	2	00	37.6	2	00	15.0	1	59	52.5	1	59	29.9	4.26	2.26
63 50	2	02	05.8	2	01	43.1	2	01	20.4	2	00	57.7	2	00	35.0	2	00	12.3	4.31	2.27
64 00	2	02	49.5	2	02	26.6	2	02	03.8	2	01	41.0	2	01	18.2	2	00	55.3	+4.37	-2.28
64 10	2	03	33.7	2	03	10.8	2	02	47.8	2	02	24.8	2	02	01.9	2	01	38.9	4.43	2.30
64 20	2	04	18.6	2	03	55.5	2	03	32.4	2	03	09.3	2	02	46.2	2	02	23.1	4.49	2.31
64 30	2	05	04.1	2	04	40.8	2	04	17.6	2	03	54.3	2	03	31.1	2	03	07.9	4.55	2.32
64 40	2	05	50.2	2	05	26.8	2	05	03.4	2	04	40.0	2	04	16.6	2	03	53.2	4.61	2.34
64 50	2	06	36.9	2	06	13.4	2	05	49.8	2	05	26.3	2	05	02.8	2	04	39.2	4.68	2.35
65 00	2	07	24.3	2	07	00.6	2	06	36.9	2	06	13.2	2	05	49.6	2	05	25.9	+4.74	-2.37
65 10	2	08	12.3	2	07	48.5	2	07	24.7	2	07	00.8	2	06	37.0	2	06	13.2	4.81	2.38
65 20	2	09	01.0	2	08	37.0	2	08	13.1	2	07	49.1	2	07	25.1	2	07	01.1	4.88	2.40
65 30	2	09	50.4	2	09	26.3	2	09	02.2	2	08	38.0	2	08	13.9	2	07	49.8	4.94	2.41
65 40	2	10	40.5	2	10	16.2	2	09	52.0	2	09	27.7	2	09	03.4	2	08	39.1	5.01	2.43
65 50	2	11	31.3	2	11	06.9	2	10	42.5	2	10	18.0	2	09	53.6	2	09	29.1	5.09	2.44
66 00	2	12	22.9	2	11	58.3	2	11	33.7	2	11	09.1	2	10	44.5	2	10	19.9	+5.16	-2.46
66 10	2	13	15.2	2	12	50.4	2	12	25.7	2	12	00.9	2	11	36.1	2	11	11.4	5.23	2.48
66 20	2	14	08.2	2	13	43.3	2	13	18.4	2	12	53.5	2	12	28.5	2	12	03.6	5.31	2.49
66 30	2	15	02.1	2	14	37.0	2	14	11.9	2	13	46.8	2	13	21.7	2	12	56.6	5.39	2.51
66 40	2	15	56.7	2	15	31.5	2	15	06.2	2	14	40.9	2	14	15.7	2	13	50.4	5.47	2.53
66 50	2	16	52.2	2	16	26.7	2	16	01.3	2	15	35.9	2	15	10.4	2	14	45.0	5.55	2.54
67 00	2	17	48.4	2	17	22.8	2	16	57.2	2	16	31.6	2	16	06.0	2	15	40.4	+5.63	-2.56
67 10	2	18	45.6	2	18	19.8	2	17	54.0	2	17	28.2	2	17	02.4	2	16	36.6	5.72	2.58
67 20	2	19	43.5	2	19	17.6	2	18	51.6	2	18	25.6	2	17	59.7	2	17	33.7	5.81	2.60
67 30	2	20	42.4	2	20	16.3	2	19	50.1	2	19	24.0	2	18	57.8	2	18	31.7	5.90	2.61
67 40	2	21	42.2	2	21	15.9	2	20	49.5	2	20	23.2	2	19	56.8	2	19	30.5	5.99	2.63
67 50	2	22	42.9	2	22	16.4	2	21	49.8	2	21	23.3	2	20	56.8	2	20	30.3	6.08	2.65
68 00	2	23	44.5	2	23	17.8	2	22	51.1	2	22	24.4	2	21	57.7	2	21	31.0	+6.17	-2.67
68 10	2	24	47.2	2	24	20.2	2	23	53.3	2	23	26.4	2	22	59.5	2	22	32.6	6.27	2.69
68 20	2	25	50.8	2	25	23.7	2	24	56.6	2	24	29.4	2	24	02.3	2	23	35.2	6.37	2.71
68 30	2	26	55.4	2	26	28.1	2	26	00.8	2	25	33.5	2	25	06.2	2	24	38.9	6.47	2.73
68 40	2	28	01.1	2	27	33.5	2	27	06.0	2	26	38.5	2	26	11.0	2	25	43.5	6.58	2.75
68 50	2	29	07.8	2	28	40.1	2	28	12.3	2	27	44.6	2	27	16.9	2	26	49.2	6.68	2.77
69 00	2	30	15.6	2	29	47.7	2	29	19.7	2	28	51.8	2	28	23.9	2	27	55.9	+6.79	-2.79
69 10	2	31	24.5	2	30	56.4	2	30	28.2	2	30	00.1	2	29	31.9	2	29	03.8	6.91	2.81
69 20	2	32	34.6	2	32	06.2	2	31	37.9	2	31	09.5	2	30	41.1	2	30	12.8	7.02	2.84
69 30	2	33	45.8	2	33	17.2	2	32	48.6	2	32	20.1	2	31	51.5	2	31	22.9	7.14	2.86
69 40	2	34	58.2	2	34	29.4	2	34	00.6	2	33	31.8	2	33	03.0	2	32	34.2	7.26	2.88
69 50	2	36	11.9	2	35	42.9	2	35	13.8	2	34	44.8	2	34	15.8	2	33	46.7	7.38	2.90
70 00	2	37	26.8	2	36	57.5	2	36	28.3	2	35	59.0	2	35	29.7	2	35	00.5	+7.51	-2.93

AUXILIARY TABLE

FOR REDUCING TO ELONGATION OBSERVATIONS MADE NEAR ELONGATION

Azimuth at Elong. *Time	0°50'	1°00'	1°10'	1°20'	1°30'	1°40'	1°50'	2°00'	Azimuth at Elong. *Time
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
1	0.0	0.0	0.0	0.0	+ 0.1	+ 0.1	+ 0.1	+ 0.1	1
2	+ 0.1	+ 0.1	+ 0.2	+ 0.2	0.2	0.2	0.3	0.3	2
3	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	3
4	0.5	0.5	0.6	0.7	0.8	0.9	1.0	1.1	4
5	+ 0.7	+ 0.9	+ 1.0	+ 1.1	+ 1.3	+ 1.4	+ 1.6	+ 1.7	5
6	1.0	1.2	1.4	1.6	1.8	2.1	2.3	2.5	6
7	1.4	1.7	2.0	2.2	2.5	2.8	3.1	3.4	7
8	1.8	2.2	2.6	2.9	3.3	3.7	4.0	4.4	8
9	2.3	2.8	3.2	3.7	4.2	4.6	5.1	5.6	9
10	+ 2.9	+ 3.4	+ 4.0	+ 4.6	+ 5.1	+ 5.7	+ 6.3	+ 6.9	10
11	3.5	4.1	4.8	5.5	6.2	6.9	7.6	8.3	11
12	4.1	4.9	5.8	6.6	7.4	8.2	9.0	9.9	12
13	4.8	5.8	6.8	7.7	8.7	9.7	10.6	11.6	13
14	5.6	6.7	7.8	9.0	10.1	11.2	12.3	13.4	14
15	+ 6.4	+ 7.7	+ 9.0	+10.3	+11.6	+12.8	+14.1	+15.4	15
16	7.3	8.8	10.2	11.7	13.2	14.6	16.1	17.5	16
17	8.2	9.9	11.5	13.2	14.9	16.5	18.2	19.8	17
18	9.2	11.1	12.9	14.8	16.7	18.5	20.4	22.2	18
19	10.3	12.4	14.4	16.5	18.6	20.6	22.7	24.7	19
20	+11.4	+13.7	+16.0	+18.3	+20.6	+22.8	+25.1	+27.4	20
21	12.6	15.1	17.6	20.1	22.7	25.2	27.7	30.2	21
22	13.8	16.6	19.3	22.1	24.9	27.6	30.4	33.2	22
23	15.1	18.1	21.1	24.2	27.2	30.2	33.2	36.2	23
24	16.4	19.7	23.0	26.3	29.6	32.9	36.2	39.5	24
25	+17.8	+21.4	+25.0	+28.5	+32.1	+35.7	+39.2	+42.8	25
Azimuth at Elong. *Time	2°00'	2°10'	2°20'	2°30'	2°40'	2°50'	3°00'	3°10'	Azimuth at Elong. *Time
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	1
2	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	2
3	0.6	0.7	0.7	0.8	0.8	0.9	0.9	1.0	3
4	1.1	1.2	1.3	1.4	1.5	1.6	1.6	1.7	4
5	+ 1.7	+ 1.9	+ 2.0	+ 2.1	+ 2.3	+ 2.4	+ 2.6	+ 2.7	5
6	2.5	2.7	2.9	3.1	3.3	3.5	3.7	3.9	6
7	3.4	3.7	3.9	4.2	4.5	4.8	5.0	5.3	7
8	4.4	4.8	5.1	5.5	5.9	6.2	6.6	7.0	8
9	5.6	6.0	6.5	7.0	7.4	7.9	8.3	8.8	9
10	+ 6.9	+ 7.4	+ 8.0	+ 8.6	+ 9.2	+ 9.7	+10.3	+10.9	10
11	8.3	9.0	9.7	10.4	11.1	11.8	12.4	13.1	11
12	9.9	10.7	11.5	12.3	13.2	14.0	14.8	15.6	12
13	11.6	12.6	13.5	14.5	15.4	16.4	17.4	18.4	13
14	13.4	14.6	15.7	16.8	17.9	19.0	20.2	21.3	14
15	+15.4	+16.7	+18.0	+19.3	+20.6	+21.9	+23.1	+24.4	15
16	17.5	19.0	20.5	21.9	23.4	24.9	26.3	27.8	16
17	19.8	21.5	23.1	24.8	26.4	28.1	29.7	31.4	17
18	22.2	24.1	25.9	27.8	29.6	31.5	33.3	35.2	18
19	24.7	26.8	28.9	30.9	33.0	35.1	37.1	39.2	19
20	+27.4	+29.7	+32.0	+34.3	+36.6	+38.8	+41.1	+43.4	20
21	30.2	32.7	35.2	37.8	40.3	42.8	45.3	47.9	21
22	33.2	35.9	38.7	41.5	44.2	47.0	49.8	52.5	22
23	36.2	39.3	42.3	45.3	48.3	51.4	54.4	57.4	23
24	39.5	42.8	46.0	49.3	52.6	55.9	59.2	62.5	24
25	+42.8	+46.4	+49.9	+53.5	+57.1	+60.7	+64.2	+67.8	25